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“It will flourish, if naturalists, chemists, antiquaries, philologists, and men of science, in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish if such communications shall be long intermitted; and it will die away, if they shall entirely cease.”—SIR WM. JONES.

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JOURNAL
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ASIATIC SOCIETY.

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No. I.—1855.

Notes on Assami Temple Ruins, by Capt. E. TAITE DALTON, Principal Assistant of the Commissioner of Assam.

The claim of Assam to a high position amongst the classic lands of the east, which has so long lain dormant, would, in all probability, have been earlier investigated, had not an idea generally prevailed that no works of antiquity were to be found in the valley to sustain it; that it was a country without such relics of past ages as are found in other parts of India, and therefore, without a history that was worth enquiring into.

But it is not thus barren; for from the Sub-Himalayas, which form its northern barrier, to the ranges of mountains separating it from Sylhet and from Bengal, and as far east, up the valley, as our knowledge extends, evidences are found of a once teeming population and a highly advanced state of art.

The trackless forests, in which most of these remains of human power and skill are found, and the present condition of Assam, with its scanty indolent population and vast wildernesses of waste, are melancholy indications that they are the works of an age and race long since passed away, and curiosity cannot fail to be excited as to who the people were that constructed them, and where they lived.

Having been authorized by Mr. Robinson to submit to the Society his views on the ancient history of Assam, I thought the subject might be made more interesting, if illustrated by some account of

the antiquities supposed to appertain to the period of which he treats, and this has induced me to string together and submit, with a few sketches my own, notes on the ruins I have visited.

Mr. Robinson has assumed that Gowhatta was the ancient, as it is the modern capital of the valley. Its former importance is indeed well attested by the immense extent of its fortifications, the profusion of carved stones which every excavation in the modern town brings to light, the remains of stone gateways, and the old stone bridges that are found within and without the city walls.

These walls, partly of masonry, embrace a tract several square miles in extent, including hills and plains, through the midst of which, confined to its main stream by natural bastions of rock, and broken and diversified by rocky islands, flows, in a basin from three-fourths of a mile to a mile in breadth, the noble Brahmaputra.

Budh could not have selected a more lovely spot for the dissemination of his doctrines or the close of his career.

The zeal and devotion of the age decorated every prominent point, in this beautiful scene, with a shrine or Choityo, in honor of the divinity or saint that hallowed it. Stone temples appeared blending with every rock; each island was adorned with a shrine; the peaks of the hills were similarly crowned; and for the pilgrim who sought retirement less obtrusive altars were raised in the recesses of valleys or groves.

But peace did not always reign in this holy vale, and the labour bestowed on the entrenchments, tells of many a hard fought struggle with an invading force.

In the fortifications of the old city care was taken to use and improve the natural defences afforded by the ranges of hills, which surround or are enclosed in them. In some precipitous places, a causeway with a breastwork, for the protection of the besieged, and semi-circular projections, as watch-towers and flanking defences, were all that were considered necessary; but, where the natural obstacle was wanting, a lavish expenditure of labour has raised embankments from hill to hill, from 25 to 40 feet in height, and not less than 30 feet in breadth on top, with a moat 100 feet wide.

The entrances to the city were by gateways of stone, some of which were subsequently replaced by archways of brick. On a

causeway, leading to the principal northern gate, is the remarkable stone bridge 146 feet in length with 22 waterways, described and illustrated in the Journal No. IV. of 1851.

Nothing approaching to the principle of an arch enters into the composition of this very extraordinary piece of architecture, the object was, evidently, to construct, in stone, a bridge on the same plan, as those the artificers had been accustomed to frame in wood. It is stone carpentry; we have posts, beams and planks, represented by columns, architraves and slabs.

Within the fortifications there is a smaller bridge, constructed on similar principles, now dismantled, and some arched stone-bridges, in good preservation, and still used, belonging doubtless to a more recent epoch. Of the religious edifices constructed within the walls, nothing but fragments remain. The Hindus have appropriated many of the most picturesque sites, and built brick temples, surrounded by the carefully dispersed stones, fragments of the old Choityos.

In some instances they have clumsily used the old materials, and in others, the ancient buildings have been dismantled to a certain extent only, and a superstructure placed on the old basement.

Some of these modern temples or clusters of temples are of considerable celebrity as holy places.

Within the old walls of Gowhatta is the temple of Kámikhyá, which is known wherever the Hindu religion prevails, and is resorted to by pilgrims from all parts of India. It is built on a hill, known as the Nil-á-chal, which rises from the banks of the Brahmaputra to 750 feet in perpendicular height, and has, doubtless, from its lofty, commanding and romantic position, always held a high place amongst the holy places of the land; but, from the different renovations it has undergone, it is of little use in exemplifying the ancient architecture of the valley.

The ancient temple must have been dismantled to within a few feet of the foundation, and covered as it is, by coatings of stucco and white-wash, we can scarce discern the beauty and elaboration of the tracery, except from fragments of detached friezes and cornices lying about.

The most singular relic is a huge finial, a stone vase measuring

(at a guess) 12 feet in circumference, which was originally the crowning ornament of the dome, but which all the power and skill of the renovators could not replace in its former position. It now lies on the ground, outside the enclosure, and a good sized tree has taken root in the bowl!

It will be seen from the note that the origin of this temple is ascribed to King Norok,* or, at all events, that it was in existence in his days. In re-excavating a large tank, in the modern town of Gowahatty, which is named after that monarch, the fragments of more than one stone temple were found, and in every part of the station, carved stones are constantly being exhumed from deep below the surface.

The present Jail Hospital occupies what appears to have been the site of a stone temple of more than the ordinary dimensions, judging from the shaft and capital of a column, an altar block and other fragments, that were dug up there, much larger than the corresponding pieces of the temple ruins elsewhere. They were found, in levelling the compound, some depth below the surface, and further excavations would, in all probability, bring the whole of the fragments of this interesting temple to light. One of the most prominent objects in the view from Gowahatty is the Oománand, the "Isola bella" of the scene; the delight of Ooma and celebrated throughout India as a holy island.

It was here that Siva is said to have communicated to Párpati the prophetic history contained in the Jogini-tantra, and all evil omens are averted by one glance at the spot so honored.

It rises about 60 feet above the stream. Groves of trees, of varied foliage, drooping over the rocks, add to its height, and above them tower the minarets of brick temples dedicated to Siva and Párpati.

* The Jogini Tantra, a work of high repute in Assam, as its contents are supposed to have been communicated by Siva to his consort Párpati, states, regarding the king Norok, that, though an "Osur" infidel, he was in such favour with the gods, that they made him the guardian of the temple of Kámikhyá. It is not improbable, that the temple was originally erected by Norok, but of this we have no certain evidence. The assertion made in the Tantra, however, would, at least, lead us to suppose, that the temple was in existence in his days.

These have succeeded stone temples, the debris of which, embracing the usual proportion of columns, friezes, &c lie scattered about.

Near the Oománand there is another mass of rock called Ooboo-see. This the river sweeps over when full, but in the dry season, there is a considerable group of rocks exposed, and upon them are carved representations of most of the principal Hindoo deities. I noticed Vishnoo, Siva and Nandi, and a female figure, seated cross-legged in a devotional attitude, with a conical cap.

Guarding a little flight of steps, there is an image of Gunesh, and the steps lead, I think, to the top of one of the rocks on which, cut in the living stone, there is a Siva and Yoni. Here too are indications of an attempt to lay the foundations of a temple, beds for the stones cut in the rock with holes for rivets.

So complete was the overthrow of the order of religious edifices we are considering, that, in many instances it is not easy to find one stone on another, as laid by those who originally constructed them. The fragments of the old temple are often degraded into the formation of steps, trodden on by the votaries of the new ; but however found, there is sufficient analogy between them, to enable us to form some idea of the positions they were intended to hold, and to refer all the buildings they composed to one style of architecture, of which there appear to have been different phases, from plain to decorated.

In forming our ideas of these temples we are greatly aided by the discovery of one, which, from its secluded position, escaped the destroyer's hand, and which, though small, is very nearly perfect, and merits especial notice.

This is one of a group of temples in south Kamrup, 30 miles S. W. of Gowhatta. It consists of a shrine seven feet square, plainly but massively built of well cut blocks of granite, with a pyramidal roof, supported by horizontally placed slabs, bearing on its summit a heavy non-descript ornament which originally supported an urn.

The building contains a stone pedestal, on which there is at present, on a detached slab, a figure of Durgá, in high relief, but she, this figure at least, does not appear to have always been the goddess of the shrine. There is but one aperture, a doorway, with lintel and uprights of carved stone, having a figure of Gunesh over the

door, and two standing figures, each a foot high, on the uprights. In front of this building there is an open porch, of the same dimensions as the shrine itself, having, like it, a pyramidal roof supported on four columns. These columns are octagon, the shafts $3\frac{1}{2}$ feet in length and 15 inches in diameter; the bases are also octagon, the subbase 20 inches in diameter. The shaft is capped by a circular slab of the same diameter as the base, the projection being hood-shaped; over this, the capital—four volutes, springing from a circle of 15 inches in diameter, supporting a cross-shaped abacus. The inner limbs of the abacus support the architraves; on the outer bracket-shaped projections, cut in the architrave, limbs rest and giving support to the protruding cornice, which completes the entablature, and forms the first step of the pyramidal roof. The interior of this roof has somewhat the appearance of a dome. On the four architraves, eight neatly cut stones lie horizontally, over-lapping the corners of the square and forming an octagon; over-lapping this octagon, another layer of slabs forms a circle, and three more such courses form as many more concentric circles, each projecting four inches beyond the one below it. The upper circle is capped by a deeply cut, eight-petalled podmo or lotus, $2\frac{1}{2}$ feet in diameter, which forms the interior ornament of the top of the dome.

The roof of the shrine is precisely the same as that of the porch. The whole structure, including a solid basement or platform of stone, which raises it $2\frac{1}{2}$ feet above the surface of the ground, is 14 feet in height.

The removal of a heap of stones in front of this edifice, disclosed the foundation of another shrine, that appears to have been surmounted by a circular or octagon temple. This covered a crypt, sunk $3\frac{1}{2}$ feet below the surface, neatly faced with cut stone and having at the bottom, bedded in a circular slab or yoni, a Mahádeva, in the form of a Linga. To the south of these shrines, and originally I believe contained within the same enclosure, there is a third temple, in a very dilapidated state; a massive building of solid masonry, 12 feet square, exclusive of projecting base, with a circular roof on the same principle as that already described, formed the vestibule of the shrine. This was surmounted by a dome springing from an octagon-shaped base four sides plain and four broken into

salient and retreating angles, which being carried up into the dome made it appear ribbed. The stones forming the dome were all horizontally placed, and were supported by the courses of slabs forming the interior of the roof. The lintel and uprights of the doorway, leading from the vestibule into the shrine, are elaborately carved with scrolls and flowers.

These domes are said to have recently fallen in, from the effects of a severe earthquake. When complete that of the shrine was about 30 feet in height. It is decorated by rows of small grotesque monsters with large ears, whether intended for men or monkeys I could not make out, for, though the temples do not appear to have suffered from wanton destruction, the exfoliation of time has effaced much of the ornament notwithstanding the durability of the materials. The stones are bound together by clamps and pins; but there is want of connection between the internal and external faces of the work, the intermediate space being filled up with rubble, and without bondstones. The effects of an earthquake would, therefore, be very likely to bring down the whole structure.

No inscription has been found amongst these ruins, nor is there any tradition regarding them worth quoting.

The next ruins I shall notice, are situated in the low hills, opposite Gowahatty, just outside the fortifications of the ancient city, and not far from the great stone bridge. I was informed that these hills contained the remains of eighteen temples. There were at all events that number of shrines: every eminence, and some of the ridges, having been furnished with them.

The most remarkable is still resorted to as a holy place. It is called *Modon Kamdeo*; the present objects of worship being two rude stone figures, villainously traducing the god of love and his mistress; but these figures were obviously never intended for the pedestal on which they rest.

The basement of the old temple to about six feet above the plinth, is all that is standing (plate II). It occupied a commanding position, on a prominent peak of the range, overlooking the plains. The top of the hill is scarped, and the holy buildings are contained in a quadrangle, which was surrounded by a wall of well cut stone, with gates guarded by large lions and groups of lions devouring elephants.

The temple encloses a crypt, eight feet square and sunk three feet below the surface, with well cut steps leading down to it. Within is an oblong stone block for the idol; it has a socket for the purpose, and a spout for carrying off the water used in bathing the image.

In front of the shrine and facing the vestibule of the temple, a single stone, ten feet in length, has two large lions in high relief carved on it, two large male figures crowned, and four female figures. This stone resembles figure, (plate IV. fig. 2,) of the Tezapore sculpture, which enables us to place the latter.

The shrine was covered with a dome-shaped roof, formed of horizontal slabs in overlapping circles, the base measures 28 feet both ways. It had originally an anteroom and vestibule of stone, in front of the shrine, the foundations of which still remain; and, from the fragments lying about, the handsome exterior moulding of the shrines, appears to have been continued round these additions.

The small bass reliefs, introduced into the external mouldings of the shrine, all represent groups of figures in obscene attitudes. The representations of the human figures are generally very much out of proportion, but apparently, purposely so, to make them more grotesque. The rendering of some of the animals is very good.

In modern times, the most frequented and celebrated of the shrines of Kamroop, is the temple of *Hajou*,* situated on a hill, about 300 feet in height, on the north bank of the Brahmaputra, 12 miles N. W. from Gowahatty. Pilgrims of the bráhmanical faith from all parts of India, meet here, and make offerings in common with Buddhists from Nepal, Bhootan, Thibet and China.

The bráhmans call the object of worship Madhob, the Buddhists call it Mahamuni, the great sage. It is in fact simply a colossal image of Budh in stone, and perhaps, of all the idols now occupying the holiest places in temples, the only aboriginal one.

* The other name by which the hill is designated is Nunnikote. The etymon of the word Hajou is traceable to the language of the Bows, who were for a long period the masters of the valley. It is composed Ha, a land and *jow* high.

This is doubtless the temple which the Mahomedan general Bukhtiyar Khilji attempted to take possession of, when he found the stone bridge dismantled and was obliged to proceed lower down the stream in search of a ford.

Its modern votaries have, to conceal mutilation, given it a pair of silver goggle-eyes, and a hooked, gilt or silvered nose, and the form is concealed from view by cloths and chaplets of flowers: but remove these, and there is no doubt of the image having been intended for the "ruler of all, the propitious, the asylum of clemency, the all-wise, the lotus-eyed, the comprehensive Buddha."

The shrine is all of stone, octagon in the plan, 30 feet in diameter, with a pyramidal roof; but it will appear from the disarrangement of many of the mouldings and cornices, and awkward position of several bas-reliefs, that the upper portion of the temple has been re-constructed from the old materials, without much precision of arrangement.

The base, to about six feet in height above the plinth, is decidedly ancient, and is the best proportioned and handsomest part of the building. On* a moulding of about two feet above the plinth a row of caparisoned elephants in high relief encircles the building, and appears to support it. The elephants are all facing outwards, stand each 16 inches in height, and are finely designed and executed; another moulding or frieze immediately above the elephants, apparently intended to represent the interlacing of reeds, is also of tasteful design and admirable execution.

The interior is a crypt, 14 feet square, into which you descend by a flight of stone steps. It contains the image and its pedestal. The door-case of the entrance to this shrine, is formed of four blocks of granite, and is ten feet high by five feet wide: a lotus over the door in the centre of the lintel, is the only ornament. The door opens into an anteroom, also of stone, ten feet by ten feet, having in niches of four feet square, stone screens, one on each side with apertures for the admission of light and air, cut in the form of lotus flowers.

Beyond the anteroom is a large vaulted vestibule measuring 40 feet by 20, built of brick and supported by massive pillars of the same material. "This† room forms no part of the original building. It is said to have been constructed by Noro Narayn, the Koch king of Kamroop, in A. D. 1550. He found the temple entirely deserted and almost lost in impenetrable jungle. Not only did he

* Plate III.

† From Mr. Robinson's MS.

cause it to be repaired, and restored to something like its original form, but he endowed it with lands, priests, musicians and dancing girls." A large colony of the latter class have sprung up in the vicinity of the temple, and one set of performers daily exhibit before the shrine.

It is certain that the vaulted brick addition of Noro Náráyn, replaced a dismantled stone edifice, which they had not the skill to restore. The flight of stone steps, from the bottom to the top of the hill, is composed of slabs, which were never cut for such a purpose, and from the appearance of these and other stones lying about, it is evident, that the temple* must have possessed other buildings of stone, besides those now extant. Not far from Hajou, and on a loftier hill, the ascent of which it facilitated by rude stone steps, is another temple composed entirely of granite now dedicated to the worship of Kédár Náth. The shrine appears to have survived the general overthrow of contemporaneous fane, but the ancient vestibule is razed to the ground and a thatched shed covers its foundation.

Near the banks of the Brahmaputra below Tezpore, the temple known as Singori or Gopeswar next claims our attention; externally it presents a most uninviting appearance, and might be passed as a very ordinary brick building of no great antiquity; but this brick work is only a sheathing, as of lava, with which the old temple is covered: above ground, outside, about ten feet of the old shrine may still be seen.

The brick shell covers the remainder and all the vestibule. The interior is however in its original state, and is very worthy of notice. It gives us the whole plan of construction of the larger temples of antiquity, and the position of most of the columns and other frag-

* The situation of these temples with reference to the town of Kusha, their site on the further bank of the Hirango, and one of them being to the present day consecrated to the worship of Maha Muni, together with the high degree of reverence paid to the place, by Budhists, would lead us to infer, with as much certainty as any short of positive testimony, that one of them was the Choityo adorned with the head ornament near which was the grove of Sal trees (there are plenty of them) where Sákya Muni went to his last sleeping bed, and near which also the rites of cremation were performed.—From Mr. Robinson's MS.

ments we find at Tezpore and elsewhere. By the deposit, for so many centuries, of the debris of the Singori hill, at the foot of which it is built, three or four feet of the most ornamental portion of the old temple is buried. Two hundred and fifty years ago, when the attempt to restore it with brick was made, the silt was removed from before the entrance only, and a flight of steps then added, to the extent of the silting, surmounted by an additional porch. As the site of the temple is high above the alluvial flats of river formation, its being thus buried is in itself an indication of great age, common to all antiquities of the same type similarly situated.

The sculptured stones found amongst the hills of Gowhatta have been dug up from deep below the surface. The great Kámikhyá temple must have been thus found by its restorer, and exhumed by the removal of the earth from a broad area all round it.

The Singori temple consists of a shrine, externally octagon in the plan, and 18 feet in diameter. One side of the building is occupied by the door, the rear and two sides at right angles to this are plain, with the exception of having each a niche formed by two half-engaged fluted pillars supporting a pyramid with a melon-shaped finial,—a miniature representation of the pyramids that surmounted the vestibule. The remaining four sides of the octagon are curiously broken into angles very effective in regard to light and shade.

These salient angles meet and blend at the base of the ornament on the top of the temple, to which they ascend by a graceful parabolic curve.

The courses of stones however continuing perfectly horizontal, I have no measurement of the altitude of this or of any similar temple, but, judging from the eye, I believe they may be all estimated, like the Cashmerian temples described by Captain Cunningham, at double the diameter of the base; that would be, in the case of Gopeswar or Singori, only 38 feet. The interior is a chamber 8 feet 6 inches square. The roof is constructed, as those already described, of well cut slabs, forming a succession of circles, diminishing to about $3\frac{1}{2}$ feet, and then capped by one slab, ornamenteally filling up the remaining space with a deeply cut, expanded lotus.

Under this, in a crypt, to which you descend by a flight of stone

steps, is the object of worship, which I could not distinguish, as the crypt was nearly full of water, when I saw it.

The outer building or vestibule was originally 24 feet square. It has two stone windows with six lancet-shaped apertures, but these are now buried, and the entrance door alone most inadequately lights and airs the building.

The roof is supported, besides the outer walls, by four very massive columns and eight pilasters, eight feet four inches in height, dividing the building into nine compartments, each surmounted by pyramids, similar, in regard to their structure as seen from within, to that over the shrine.

The centre compartments, including the pillars, measure ten feet ten inches each way. The four corner compartments are also square in the plan, measuring each three feet nine inches, and the side compartments are consequently 10 feet 3 inches by 3 feet 9 inches; additional slabs are placed close together on the architraves of these oblong compartments, till the opening obtained at the base of the pyramid roof is a square.

The shafts of the columns are octagonal, to within a foot and a half of the capital; thence they are square, and the plinth of the capital, fitting on to them, is also square, in other respects they resemble the restored columns in plate VII.

The shafts measure 5 feet 10 inches in circumference, and their massiveness gives to the interior a very solemn, cave-like appearance.

This temple is held in great veneration by the Buddhist Thibetans and Bootias. They visit it annually and leave here their long tresses, cut off on assuming monastic garments.

TEZPORE OR PURA RUINS.

The fragments of columns, friezes, cornices and various other carved stones, known as the Tez pore or Pura ruins, are so found as to leave it to be implied, either that the structures for which they were intended were never completed, or, that having been built, they were so effectually overthrown that scarce one stone was left upon another. On a closer inspection both hypotheses are required to account for their present position. In some, and by far the

greater number, of the stones, there are, in the rusty rivets and clamps, and other appearances, evidences of their having been put together; in others, the absence of these indications, and the unfinished state of the chiselling, denote they were still in the hands of the stone-cutter, when the works were interrupted.

The contemplated number of temples had not then been completed when the work of destruction commenced. The blocks are all of the hardest granite, quarried from the neighbouring hills, and no little skill and taste were required to produce, out of such material, designs so graceful and so deeply and delicately carved, as we find them.

In the production of these works the art had reached its culminating point; it set in a blaze, like a meteor, never to appear again.

In the Journal of the Asiatic Society No. 40, for April, 1835, there is a paper, on these ruins, by Capt. G. E. Westmacott; it gives a fair idea of their vast extent and spirited execution, but the writer has so entirely mistaken the nature of some of the fragments, as to give very erroneous ideas of the style of architecture intended.

In his description of the columns, page 186, he uses as bases the cross-shaped blocks, which by reference to other temples, we find to be capitals. The large square slabs, referred to in page 192 as altars, measuring 46 feet all round, were each intended to form the entire flooring of a shrine. The raised position of one, alluded to by Captain W., with steps, is a fanciful arrangement of the loose stones by some modern devotee. The stones supposed by Captain W. to be voussoirs of arches, are the segments of the circles used in the formation of the pyramidal or conical roofs; those from the centre ornaments, mistaken for the key-stones, being the corner stones of the first course of the cone; the ornament filling up the angle exposed, where the cone rested on the square of the four architraves.

The square blocks referred to in the same page, as "measuring from 20 to 30 feet, concave in the centre, and sculptured in imitation of chaplets of flowers," supposed by Captain Westmacott to have been "beds, or altar places of Siva," were intended for the crowning slabs of the pyramidal roofs of the temples.

The carving represents the expanded petals of the lotus; and the

flattish surface of the seed-beds in the centre of the flowers, Captain Westmacott mistook for the rests of "Lingas." A few of these symbols are found in and about Tezapore. On the hill beyond the sepoys' lines, there is a shrine of brick, containing one, 7 feet in girth, in a circular Yoni between 7 and 8 feet in diameter. The others are fitted into Yonis, sometimes square and sometimes round, but the Lingas are all of the same form, square at the base, octagonal in the centre, and circular in the plan of the upper portion, which appears above the Yoni.

The socket of the Yoni is cut so as to accord with the square and octagonal portion of the inserted part of the Linga. It will be observed, from this mode of construction and insertion, that it was impossible, without moving the Yoni, to disturb the Linga; where the former is large and heavy and firmly fixed in masonry, by rivet or clamps, it would have been no easy matter to have moved either.

In the destruction of one of the temples dedicated to this worship, and which, till very recently had not been disturbed since its overthrow, a Yoni of vast weight, measuring three feet two inches square, was dislodged, and sent flying over the head of its Linga, which it fractured and caused to incline as it passed; by no agency, that I can think of, but gunpowder. There was also a stone door case, the lintel and uprights of which lie broken, by some force, that projected the pieces in the same direction as the Linga.

This Linga, four feet in length, was contained in a shrine of brick, and that was not the only brick edifice amongst the holy buildings of Pura, some of these appear to have been built as depositaries for cinerary urns.* One solid mass of brick masonry, on being removed, was found to enclose a small square chamber, in which there was an urn, containing ashes and fragments of burnt bone.

The urn was unfortunately broken by the workmen. It was of very superior black pottery, ornamented with flowers in basso relief, and from the fragments seen, the form is represented to me, as having been something like fig. 2 Plate VII.

* In Col. Wilford's account of ancient India, the Rishis held sovereignty in Assam. The figure at the base of the large pillar (Plate V.) is recognised by intelligent Hindoos as Nareda Rishi and the Rishis burned their dead, preserving their ashes in Dagopes or Topes.—S. F. Hannay.

The bricks used in these buildings are very peculiar. They are moulded in the various forms required to suit the positions for which they were destined, as constituents of domes, cornices, finials, &c. We find them, therefore of various forms and sizes, some with decorative mouldings, some plain.

From the appearance of the overthrown brick edifices, I think they had brick domes, but not arched, the bricks, like the stones, were moulded so as to form circles, overlapping till they, from all sides, met or nearly so. Very long, truncated, wedge-shaped bricks, adapted for such a formation, are found.

No lime appears to have been used in putting these buildings together, and from this and their construction, it must have been easy to overthrow them.

Captain Westmacott found no brick buildings, but the modern station of Tezpore has risen amidst the ruins he described; the dense forests, that impeded his observation, have been removed, and, though vast quantities of finely cut stones have been buried, to form the foundations of modern buildings, the more ornamental fragments were spared, and still remain in sufficient number and variety, to enable us to form some idea of the structures of which they were members.

In this we are assisted, by the uniformity of design to which the architect was reduced, by his ignorance of the principles of the arch, and poverty of invention.

In his stone buildings, he appears to have had but the one form of covering, well known in Indian architecture; and as he could not go beyond certain dimensions in the square, from which his pyramidal roofs sprang, he could only obtain additional space by a repetition of the squares and pyramids.

Had we, therefore, all the constituent parts of only one temple before us, however scattered, we might easily estimate its magnitude, and even put it together again; but we find at Tezpore, slabs for six or eight altars; each of these had its shrine and vestibule, and so the immense profusion of the ruins, indicate rather the number, than the magnitude of the Pura temples; and as the fragments that remain, are not all now, where they were first found, and so many have disappeared from the scene, it becomes impossi-

ble to assign to each shrine, its due proportion of columns and roof finials. I think, however, an effort was made to construct here one temple, in a more elaborate style of decoration, than any that had yet been attempted, and this temple I will endeavour to put together.

In plate IV. figures 1 and 2, and in plate V. I have given representations of the three most beautiful of the Tezpore sculptures. From adaptation, by measurement, and exact correspondence of ornamental borders, I find that figure 1 of plate IV. is the epistylum, which was supported, on two such pillars, as that represented in plate V. and these pillars had for their bases, the compartments of the stone, with the lines and urns, represented in figure 2 of plate IV. which contains the dancing girls and musicians.

A stone similar to this, I found, *in situ*, in another temple, as already noted; and I have no hesitation in placing these four in an analogous position.

They surrounded the entrance to the *adytum*, of the great temple of Pura, and by taking the largest slab of those described as the pavement of shrines, for our purpose, we find, that this adytum, which contained the object of worship, was 12 feet square inside. Externally, this shrine must have been covered by a dome, similar to the one described (*ante p. 11*) in the notice of the Singori temple, springing from a base octagon in the plan, thirty feet in diameter, and twice that in height; the whole basement of this dome was very floridly ornamented, with cornices of Satyr heads, and beadings in festoons, (*vide figure 2, plate VI.*) and other mouldings, and had also, on three sides, the niches as described for the Singori temple.

The vestibule, exteriorly and interiorly, was as highly decorated as the shrine itself. The capitals of nine pillars and pilasters were found by Captain W. In the spot I have selected for its site, I have no hesitation in saying, there must have been more; and supported by these pillars and pilasters, the vestibule was covered and adorned, with certainly not less than nine, but probably, twelve pyramids, externally supporting urns and other ornaments, and internally, presenting the conical roofs of ornamented circles, as seen at Singori and elsewhere. In plate VIII. I have attempted a perspective sketch of the internal appearance of such a temple



The epistylum, over the entrance to the shrine, has nine male figures, six represented as singing, and three in graver attitudes occupying more prominent positions, and each attended by two females; underneath, in the line of a richly chased border of scrolls, entwining birds and animals, executed with fidelity and grace, is a figure of Gunesh, who appears to hold a similar position, as custodian to the entrance of most of the shrines. In attendance upon him are, two slender-waisted females. The merry couples, in the side compartment of the stone, represented in figure 2, of the same plate, and to which, in my restoration, I have assigned the position of lower member of the door-case, are engaged in a dance, to this day, well known in Assam under the name of the Boisak Bihu dance.

The Mag and Boisak Bihus are the two national festivals of the Assamese. The observances connected with these festivals, have nothing to do with the Hindoo religion, and their origin is involved in some obscurity. They belong, not to the present, but to the ancient religion of the country, and what this was, may be indicated by the fact that the Buddhist Shyans and Burmese, on the borders of Assam, if not through all Burmah, at the same time of the year, or nearly so, have their two great festivals in honor of Buddh.*

In the observances of the festivals, as held by the Assamese and Burmese, there is a remarkable resemblance.

Preparatory to the first festival, the young lads of both races, build up with care a lofty pile of firewood. After much feasting and dancing on the previous day and throughout the entire night, this is set fire to at early dawn.

The Khamptis call it *Moika Soomphoi*, and with them, it is, I believe, the anniversary of the birth of Buddh. The Assamese call it *meji*, but can assign to it no definite origin. In the second festival, the Khamptis commence by bathing all their images of Buddh, this is followed by sports and feastings, but the women do not dance.

The Assamese, on the first day of the Boisak Bihu, bathe all their cows, and subsequently, for seven days, devote themselves entirely

* Called the Pocham and Pochi respectively: see ceremonies required to be performed on the death of Chakin in Turner's Buddhistical Annals.—S. F. Hannay.

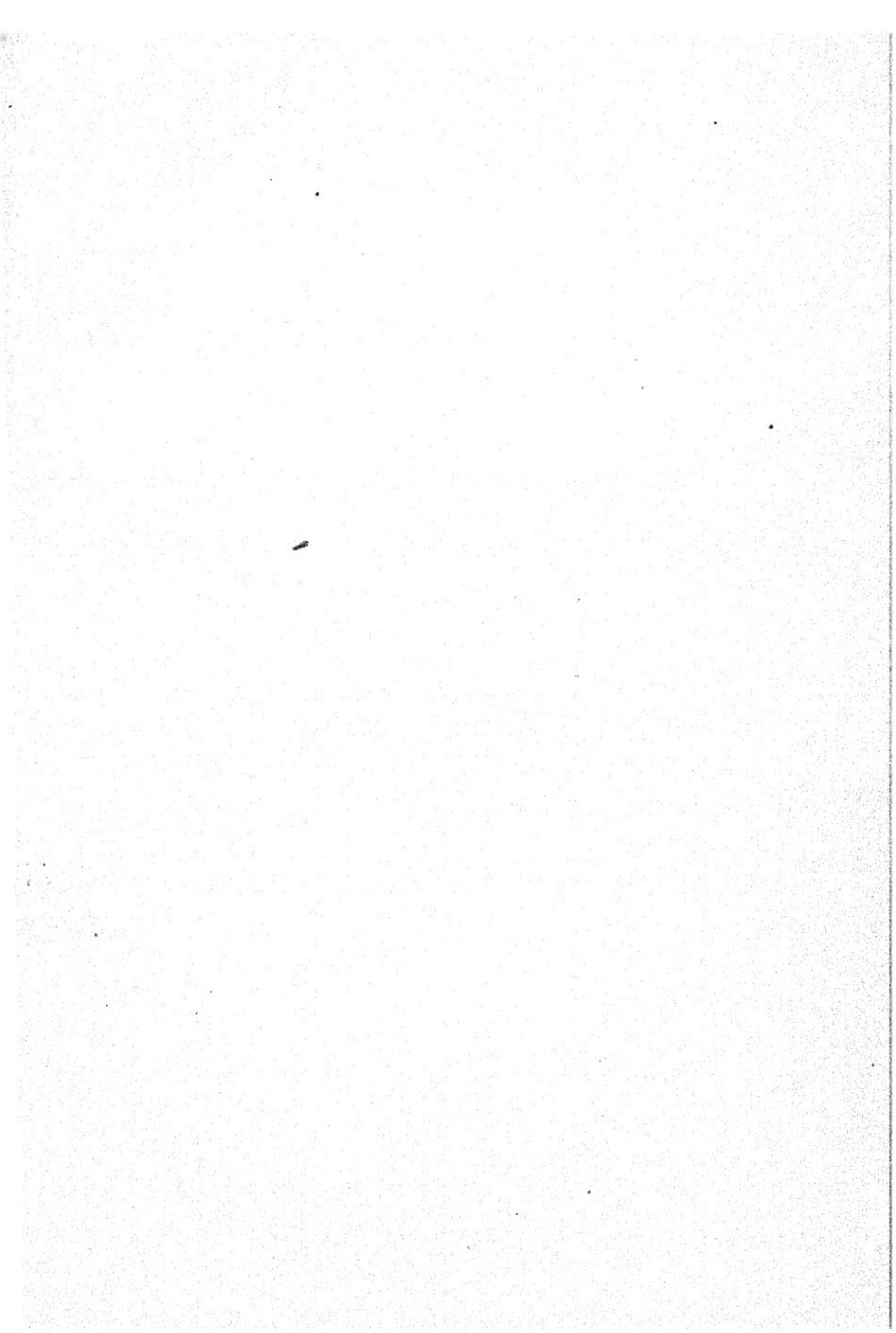
to feasting and amusement. The inhabitants of a large circle of villages, meet daily in one place; lascivious* dancing and singing are the chief attractions, and some of the attitudes and gestures used, are precisely those represented in the sculptures.

The upright stone in plate V. measures $10 \times \frac{2}{3} \times 2$ feet. The small central figures, each 8 inches in height, represent five of the Avatars of Vishnu; the missing pillar, to correspond with this, may have represented the remaining Avatars: all these surrounded the entrance to the shrine, but no figure has been found, adapted to the altar that the shrine contained.

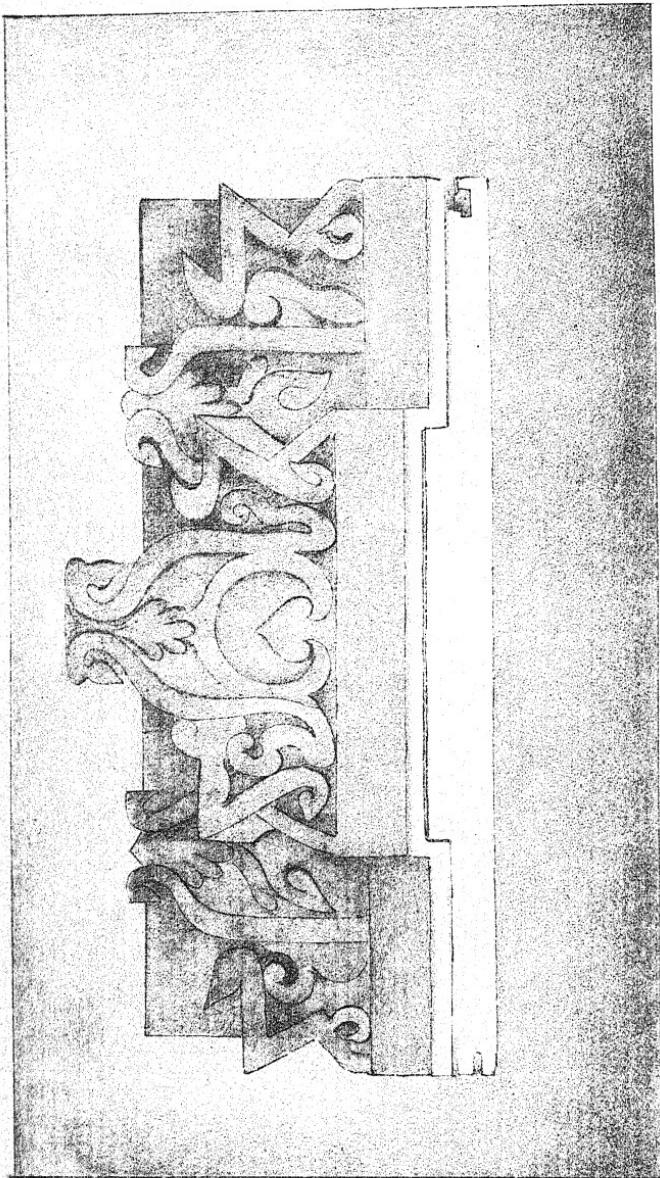
The shafts I have taken for the columns of the temple, I have been describing, are not more than $6\frac{1}{2}$ feet in length. Besides these, four have been found amongst the ruins, ten feet long, and close to where they were discovered, Captain Westmacott observed "vast fragments of the epistylum and frieze, carved with beaded drapery, half buried in the soil."

These fragments which probably formed the entire entablature of the columns, have now disappeared; Captain Westmacott is, I think, correct in the position he assigns to them, but I have no precedent for, and would be at a loss to place, the Grecian style of portico he imagined them to have formed. I took considerable pains to find amongst the ruins the remaining members of the column, of which these were the shafts, and the result is shewn in plate VII. where I have given an elevation of the restored column. It is in four pieces; 1, the capital, from A. to B.; 2, the shaft, from B. to C. with an ornamented top, a cornice of Satyr heads and beading, surmounted by a double moulding; 3, the surbase, C. to D.; 4, the base, D. to E. My idea of these four columns is, that they supported the roof of an open detached building resembling the porch of the Choiung temple; such detached buildings are generally added to the modern temples, as a receptacle for the object of worship, when taken out for an *airing*; or they may have formed the covered entrance, to the walled enclosure containing the temples.

* Into lasciviousness it may have degenerated in Assam, but originally it was not so intended. Nor do the Burmese or Shyans practise such at the present day. The contortions of the body, the "reeling to and fro" are intended to represent violent grief and distraction.—S. F. Hannay.

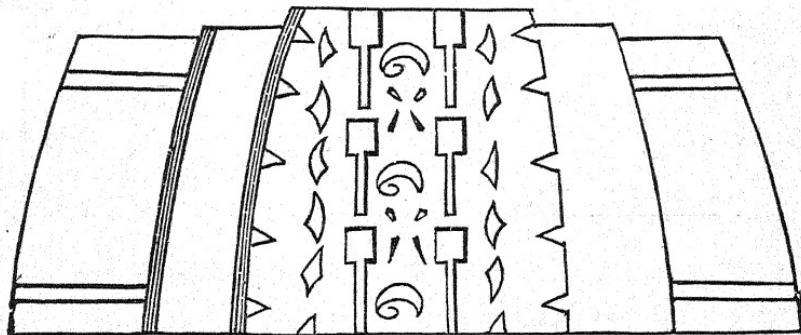


Tezpore Sculpture.



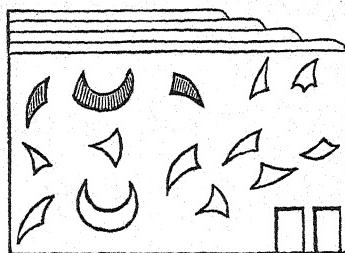
Captain Westmacott found stone walls running in various directions. These have now been removed ; but that the holy buildings were all contained within a spacious enclosure, sufficient for them and a large monastic establishment, is highly probable. We have it from Hiuan Thsang, the Chinese traveller in India, in the seventh century, that such existed in Assam in his day, though neglected and holding heterodox opinions. May not the extensive monastic establishments of Assam, Vishnuvis of the present day, have originated in ancient Buddhist monasteries ?

Of one of these modern institutions, I have given an account in Vol. XX. of the Journal. I have recently visited another, the Awoniáthi in the Majulé, the head priest, second priest and all the inmates of which are monks ; and the sacerdotal dress is a cloth of a garnet colour similar in hue to the robe worn in the Lamesories of Bootan. The huts of these monks form an extensive quadrangle, surrounding their place of worship, and no women are allowed to take up their quarters there. No inscriptions have been found appertaining to these ancient temples ; but in plate V. figure 3, and in plate XXXV. there is a representation of a stone, the carving on which is so singular, that it must surely have been intended, for something more than mere ornamentation, if this be doubtful, a symbolical object must be ascribed to the figures on the other stones represented below.



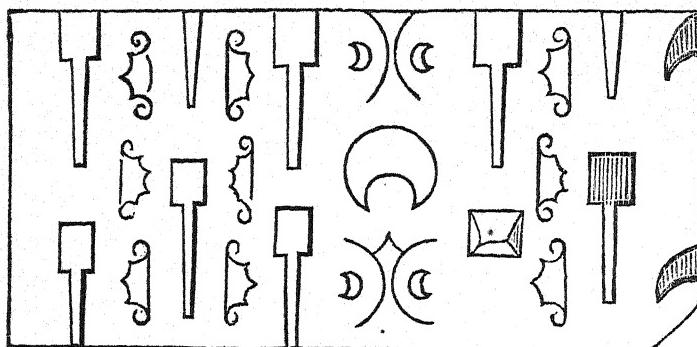
Seebsagur.

(But supposed to have originally been found in Central Assam.)

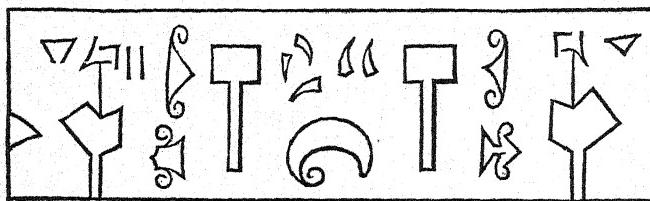


Singori Temple.

Stones, thus marked, are found amongst the ruins of all the old temples; the outer faces of the stones intended for the domes of the Tezapore temples, are covered with them. Two of them are shewn in the following cuts.



Tezapore.



Tezapore.

There is a large figure of Gunesh, cut in a rock, near what must have been the water-gate of the monastery. It is in high relief and well designed.

Ascending the river from Tezapore, we find ruins of ancient temples at Bishnauth, which was, no doubt at one time, a place of very holy repute, and one of the strongholds of the valley, there being

These military works abound in the valley, many of them, traditionally ascribed to apocryphal local heroes, are more likely to be the remains of fortified camps, occupied by invading armies, at times, when those who had anything to fear from the hostile force, betook themselves to the strong places constructed on both sides of the valley, in the passes into the hills.

I have seen some of these forts, and have heard of more. They are partly of masonry; well-cut and well-fitted blocks of stone, or huge ramparts of earth, faced with brick; and all so constructed, as to render it obvious that the intention was not to protect the plains from forays from the highlands, but to check the advance, towards the hills, of a hostile force from the plains. It is not likely that the hill savages could have raised such works, the inference is, that they must have been built by the inhabitants of the valley to cover the passes to the hills, in which they took refuge from the invading armies.

I shall conclude with a notice of some very interesting ruins, I recently visited, in the first range of hills due north of Dibrooghur, on the banks of a small river called the Gogra, an affluent of the Seesee. As it debouches from the hills, the Gogra takes a sweep round the last hill so as almost to encircle it. This hill is scarped, and upon the flat surface obtained, about 60 feet above the level of the water, we have the remains of three temples, 30 paces apart.

The existence of these ruins was unknown, even to the natives, till a few years ago their accidental discovery was communicated to Major Hannay, who visited them; they are in a part of the country fifteen miles distant from any village or habitation, and never frequented, except by gold-washers. However effected, the destruction of these temples was complete, three huge heaps of carved stones, some of them very large and heavy, consisting of shafts, capitals and bases of columns, cornices, architraves, friezes, massive door-cases, altar blocks and the component parts of pyramidal roofs or domes, are all found commingled confusedly, as if, after the overthrow, it had been intentionally done, to defy restoration. As they lie, however, it is obvious that each temple consisted of a shrine and vestibule, the latter supported on pillars and pilasters.

The pillars and architraves of the first and smallest temple, are

very singular, preserving in the plan, the cross shape of the capital (Fig. 1 Plate X.) ; heads, shoulders and arms, of human figures appear as the supports of the abacus, and the same arrangement is followed up in the architraves, from which spring the domes ; and from other fragments found, there must have been a cornice, thus ornamented, all round the building.

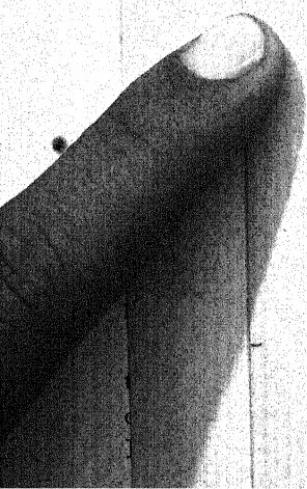
The columns were not larger than those of the Choigong temple, and from the pilasters, these temples had all closed vestibules, not open porches like that represented in plate I. Round the base, above the plinth, the first and smallest of the Seesee temples, had a row of elephants shewing the head and fore-legs, in high relief, as in the Hazoo temple (vide plate XXVIII.)

In regard to the divinity, to which it was dedicated, a large figure of Durgah was found worthy of holding that position ; and no doubt she was at some period, if not always, the object of worship there. The second temple, from the space covered by the ruins, appears to have been about 60 feet in length by 40 in breadth, including the shrine and vestibule. I extricated the altar block from the ruins of the shrine, and found, broken into several pieces, another figure of Durgah, the pedestal of which neatly fitted on to the block, and there could be no doubt that the one was intended for the other.

The figure and pedestal measured 5 feet 5 inches. The Durgah herself, when she possessed a head, which I could not find, must have measured 3 feet 6 inches from the crown to the feet ; about one third larger than the Durgáh of the first temple.

The arrangement of the two figures is somewhat different, but both represent the goddess in her most terrific form, embodying by no means feebly, the power of the divine energy in action. Kálí or Durgáh appears to have been for some centuries, the favourite divinity in Eastern Assam, and it is possible, that the blood of human victims may have been shed before her altars here, as well as at the shrine dedicated to her, known as the copper temple, above Sudyá.

Yet, the figures on the lintels of the doorway and other parts of these and the third temple, do not appear to me to be emblematic of the Saktí form of worship. The grave figures, (Pl. IX. fig. 2, and Pl. X. fig. 3) seated cross-legged, in postures of profound meditation,



some with uplifted hands in the attitudes of exhortation or benediction, are surely Buddhistical.

The third temple of this group, must have been on a larger scale than the other two. Its existence was previously unknown to my guides who had only told me of two, and, so dense was the jungle, it would have escaped my notice, had I not determined to cut through it and examine all the scarped portion of the hill. I soon saw that it was the principal temple of the group, and set to work to clear the jungle, so as to obtain an idea of its dimensions and form; but after this was effected, all the men I had with me were unable to move some vast slabs, used in the construction of the roofs, under which the more ornamental portions of the building and the altar and idol lay buried. The ruins did not cover a greater space than that occupied by the second temple, but the heap was higher, and the blocks, generally, twice the size of the fragments of the other two.

With great difficulty I managed to obtain such a view, as enabled me to sketch parts of a lintel and a pillar of a door-case, (plate X. fig. 4) the latter measured 6 feet 10 inches by one foot nine. Across the lintel, which was of sand-stone a ponderous architrave, of coarse granite, (measuring 11 feet 10 inches by 2 feet 8 inches and 1 foot 10 inches) had fallen and fractured it.

The pillars and pilasters used in this temple were about the same size as, and resembling exactly in form, those of the Singori temple.

The great proportion of these ruins are of sand-stone, of which, the first range of the neighbouring hills, for some miles, is chiefly composed; but there are also blocks of granite, of different degrees of fineness, and they must have been transported from a very great distance.

In point of execution, the carving of the sand-stone is equal to the Tezpore sculptures, but then, the latter are all of granite, and with the exception of the Durgahs, the granite blocks of the Seesee temples are very rudely chiseled.

The carving of the sand-stone blocks of the first and second temple is very much mutilated and defaced; it is not so with the blocks you exhume of the third temple; they were doubtless in excellent

preservation, when the temple was destroyed, and having been soon covered by decayed vegetation, and perhaps undisturbed for centuries, the chiseling is as sharp and decided as if it were quite new.

Over the centre of the door was a well executed figure of Gunesh, in high relief, represented as seated on a platform under a portico. The other figures appear to be all Buddhist; and if so, is it not probable, that this was originally a Buddhist temple, subsequently dedicated to the Sakti worship?

A Memoir on the Indian species of Shrews, by EDWARD BLYTH, Esq.

As an incentive to the investigation of some of the most imperfectly known of Indian mammalia, and not the most inviting of groups to amateur students, we shall here endeavour to bring together, and to reduce or digest into intelligible form and order, the scattered materials available for a Monograph on the Indian Shrews. It may lead to the discovery of additional real species, and probably to the diminution of the number of present supposed species; besides conducing to the further elucidation of those at present known and recognised, and especially to a better knowledge of the extent of their geographical distributions.

In general, the Shrews of tropical and subtropical countries are distinguished by their comparatively large size, and slaty hue of every shade from pale grey to black, with rufous tips to the fur more or less developed, though in some scarcely noticeable;* the ear-conch is conspicuously visible above the fur; the tail thick, tapering, and furnished with scattered long hairs, which certain species also exhibit upon the body; and the teeth are wholly white,† and of the following type of structure. The superior front-teeth or *quasi-incisors* (vide *J. A. S.* XX, 164), are large and strongly hooked, and much longer than their posterior spur; while

* In at least some species, the rufous tips would appear to increase with age; and, to a considerable extent, the colour of these animals is darker, according to the increase of altitude inhabited by a species.

† While preparing this memoir, we discovered a remarkable exception in the instance of *SOREX MELANODON*, n. s.

the inferior have rarely so much as a trace of a serrated upper edge : of four upper praemolars anterior to the *carnassiez*, the first is large, the second and third are much smaller, the fourth is diminutive, and the third exceeds the second. This group of Shrews is familiarly exemplified by the common large musk Shrews of Asia and Africa, and constitutes the restricted *SOREX*, L. (v. *Pachyura*, de Selys Longchamps).*

The Indian species are as follow.

1. *S. CERULESCENS*, Shaw: *S. pilorides*, Shaw: *S. giganteus*, Is. Geoffroy: *S. murinus*, L., apud Gray: figured in Hardwicke's *Ill. Ind. Zool.* as *S. myosurus*, Pallas; whence probably *S. myosurus* apud Walker, in *Calc. Journ. Nat. Hist.* III, 255. The common Musk Shrew, or (*eulgo*) 'Musk Rat,' of Bengal, &c. (but very different from the 'Musk Rat' or *Muskquash*—*FIBER ZIBETICUS* of N. America, which is a rodent nearly affined to the Voles—*ARVICOLA*).

This animal is described by Mr. Hodgson in the *Ann. Mag. N. H.* XV, 269 (1845); but the length of the tail (as given), $3\frac{1}{2}$ in., is possibly a misprint for $3\frac{5}{8}$ or $3\frac{7}{8}$ in., or more than half of the length of the head and body, which is given as 6 in. Number of caudal vertebræ, 24. Total length of skull of adult male, with front-teeth *in situibus*, somewhat exceeding $1\frac{5}{8}$ in.; of female, somewhat under

* Certain small species of temperate climates were detached by Wagler from the ordinary Shrews of those climates (with piceous-tipped teeth, &c.,) by the name *CROCIDURA* (v. *Suncus*, Ehrenberg, apud Gray); e. g. *S. ARANEUS*, *S. LEUCODON*, *S. ETRUSCUS*, &c.: but we are not aware that these are separable from the above; and certainly the various Pygmy Shrews of India are typical *SORICES*, except that some only of them want the odoriferous glands on the sides of the body.

N. B. In the 'Report on the Quadrupeds of Massachusetts,' published by the Government Commissioners of the Zoological and Botanical Survey of the State (1840), the extraordinary statement is made by Mr. E. Emmons, that "In the specimens of *SOREX* which have fallen under my observation, I have not been able to discover, even with the microscope, any nostrils, the termination (or the extremity) of the nose being apparently an imperforate membrane." Upon reading this, we examined several species (large and small) preserved in spirit; and easily detected a lateral valvular orifice, which, on pressure of the snout above, was shewn to be perforate, by the fluid oozing through. Could Mr. Emmons have tried so simple an experiment?

greatest breadth of skull of former, $\frac{1}{16}$ in. ; of latter, $\frac{5}{8}$ in. Colour uniform pale grey, slightly tinged with ferruginous, and more conspicuously on the lower parts; the naked parts flesh-coloured.

This is the common large Musk Shrew of Bengal, Nepal, and we believe the valley of Assam; becoming rare in Sylhet; and wholly disappearing in Arakan. In Nepal, Mr. Hodgson styles it "the common House Shrew of the plains, and also of the hills, up at least to 6000 ft." We have seen specimens from the neighbourhood of Agra: but whether it be the common Musk Shrew of S. India is doubtful on present evidence; though Dr. Kelaart's description of the Cinghalese animal corresponds. It certainly does not appear to inhabit the eastern coast of the Bay of Bengal, from Arakan to the straits of Malacca. Dr. Horsfield gives as its habitat "India generally, and the eastern islands;" and he notes a specimen from Butan, presented to the India-house collection by Major Pemberton. We suspect that its reputed existence in the Malay countries needs confirmation.

In addition to the names above cited, Dr. Gray, in his Catalogue of the specimens of mammalia in the British Museum (1843), refers the following name and synomyms to this species. *S. MURINUS*, L.: *S. myosurus*, Pallas: *S. indicus* et *S. capensis*, Geoffroy: *S. Sonneratii*, Is. Geoffroy: *S. crassicaudatus*, Lichtenstein: *S. nipalensis*, Hodgson: and *S. moschatus*, Robinson. The last two are merely MS. names; and indeed the zoological appellations in Mr. W. Robinson's 'Descriptive account of Assam' are given pretty much at random, and would establish a most extraordinary community of species among the mammalia of that country and of Europe! He gives, "Genus MYGALE. *Sorex moschatus*, Cuvier. The common Musk Rat." Now *Sorex moschatus*, L. (nec Cuvier), is the type of the genus MYGALE of Cuvier; altered to MYOGALEA, Fischer (*Myogale apud Rüppell*), because pre-occupied by Linnæus for a well known genus of Spiders: and MYOGALEA MOSCHATA is a Russian animal, generically differing from Mr. Robinson's Musk Shrew. Nevertheless, his adoption of the term *moschatus* would seem to indicate the rankly smelling *S. cÆRULESCENS*, rather than *S. MURINUS* (v. *myosurus*), which is the only Shrew mentioned in Prof. Walker's list of the mammalia of the same province.

S. INDICUS, Geoffroy, v. *S. Sonneratii*, Is. Geoffroy, is accepted as a distinct species from **S. CÆRULESCENS** in Dr. Horsfield's Catalogue of the specimens of mammalia in the India House Museum (1851); and a specimen is noted from the Dukhun, presented by Col. Sykes, and the following habitat given for the species—"Continent and islands of India." Col. Sykes terms it the *Cheechonder* of the Maharrattas; being the same name which is applied to **S. CÆRULESCENS** in Bengal, spelt *Choochundr* by Dr. Cantor (*J. A. S.* XV, 191), and the latter author gives "*Chinchorot* of the Malays of the peninsula" as the name of the very distinct species referred by him and others to **S. MURIRUS**, L.; which latter was originally described from Java. According to Col. Sykes, these troublesome and disagreeable animals are very numerous in Dukhun, but much more so in Bombay. The sebaceous glands in an old male were observed to be very large, and the odour of musk from them almost insupportable; while in an adult female the glands were scarcely discernible and the scent of musk very faint. [It is tolerably strong in the female of **S. CÆRULESCENS**; though more or less so, perhaps, with reference to sexual condition.] "The **SOREX INDICUS** and **S. GIGANTEUS**," it is added, "are regarded by Col. Sykes as specifically identical, he having killed them in the same room, and seen them frequently together." (*P. Z. S.* 1831, p. 99). Prof. Schinz accordingly assigns **S. GIGANTEUS**, Geoff., "*Ann. du Mus.* XV, pl. 4, of 3," as a synonyme of **S. INDICUS**: but the reference is erroneous, the *Mémoires du Muséum*, tom. XV (to which we have not access), being probably intended. **S. GIGANTEUS**, Is. Geoff., *Voy. de Belanger*, refers to **S. cærulescens** of Bengal.

According to M. Isidore Geoffroy, the **S. INDICUS** (his *S. Sonneratii*) is a smaller animal than **S. CÆRULESCENS** (his *S. giganteus*), with tail forming always *a quarter* of the entire length. Length of head and body of adult, a little under 4 in. (Fr.). Fur ashy, washed with russet-brown; and pale ashy below. Inhabits the Coromandel coast, and also the Mauritius. If truly a distinct species from **S. CÆRULESCENS**, its natural habitat is probably W. India: but we have vainly sought for information of such an animal.

In Dr. Rüppell's printed Catalogue of the specimens of mammalia in the Frankfurt Museum (1842), examples referred to **S.**

INDICUS, L. (Fr. Cuv. *Mamm.* II, t. 28), are noted from Java, and also from Massoua and from Suez; and a supposed variety, termed by him **S. INDICUS**, var. *cinerœo-aenea*, from Schoa: and he elsewhere suggests that these animals have probably been introduced by the shipping from S. E. Asia and its islands, and so found their way over to Schoa, where a different climate had affected the colouring of the fur. On ship-board they could of course subsist on **BLATTE**: but their presence (certainly that of the fetid **S. cærulescens** of Bengal) would scarcely escape remark, the more especially as that of a single individual might seriously damage a whole cargo; besides the obvious necessity of both sexes being required to continue the race, a condition most likely to be fulfilled by the conveyal of a pregnant female with her future litter of some 5 or 6, **S. CRASSICAUDUS** (*nec crassicaudatus*), Lichtenstein, refers to a Musk Shrew inhabiting Egypt, and stated to be common about Suez; which may therefore be presumed identical with Dr. Rüppell's **S. INDICUS** from Suez; and the description certainly seems to approximate that of **S. cærulescens** (length $5\frac{1}{2}$ in.; tail $2\frac{3}{4}$ in.): and **S. CAPENSIS**, Geoffroy, is termed **S. FRANCICUS** by Prof. Schinz, who gives Mauritius as its habitat (length 3" 8"; tail 1" 9"). The most notable identification is that of Dr. Rüppell's specimens from E. Africa and from Java, presuming the latter to be really from that island.

2. **S. MURINUS**, L.: *S. myosurus*, Pallas: *S. cærulescens*, var., Raffles: *S. Griffithii* (?), Horsfield: the common Malayan species originally described from Java, and by Dr. Cantor in *J. A. S.* XV, 191, and thus denominated by him after Prof. Schinz (*Synopsis mammalium*), who states it to inhabit Java, Sumatra, Borneo, Celebes, Amboina, *Japan*, *Bengal*, *Abyssinia*, and the *Cape of Good Hope*. We have italicized the habitats which probably need verification: and the Society possesses specimens from the Arakan and Khásya hills, which accord with Dr. Cantor's description, *l. c.*; but less so with M. Geoffroy St. Hilaire's figure, in the *Annales du Muséum d'Histoire Naturelle*, tom. XVII, pl. 3, f. 2, which may nevertheless be intended to represent the same species. As compared with a mature female from Arakan, taken out of spirit, the ears in M. Geoffroy's figure are represented too small, and neither the snout nor

tail is sufficiently elongated. Length of this Arakan female—head and body 5 in., and tail 3 in.: hind-foot (with claws) $\frac{7}{8}$ in. Unfortunately, we have no Malayan specimen for actual comparison: but there is every reason to suspect that this species replaces *S. CERULESCENS* along the whole eastern coast of the Bay of Bengal, and thence through the hilly country northward, to that skirting the valley of Assam. Dr. Horsfield mentions a Nepalese specimen, presented to the India House museum by Mr. Hodgson: but this species is unnoticed in the latter gentleman's Catalogue of Nepalese animals, and especially in his descriptive notices of the Nepalese Shrews, *Ann. Mag. N. H.* XV, 269. With the exception of the small *S. TENUIS*, *S. Müller*, from Timor, it appears to be the only well established species of Shrew throughout the great oriental archipelago. In the Tenasserim provinces, the Rev. J. Mason states—"We have at least two species of Musk Shrew, both of which emit an offensive odour." (*Qu. S. MURINUS and S. SERPENTARIUS?*) In *S. MURINUS*, according to Dr. Cantor, "the smell of musk, emitted by the adult animal, and which in the young is barely perceptible, is much less intense than in the Bengal Musk Shrew." *S. SERPENTARIUS*, according to Dr. Kelaart, has a powerfully offensive musky odour. *S. MURINUS* has larger ears than *S. CERULESCENS*; and Dr. Cantor describes it as—"Dark brownish-grey above, beneath light brownish-grey. Feet and tail flesh-coloured in the living animal, changing to cinereous after death. In the young the colour is more of a bluish-grey, slightly mixed with brown on the back. A stuffed specimen from the Khásya hills has the fur longer and less dense than in *S. CERULESCENS*, the piles somewhat curly; and colour dark ashy at base, with rufous-brown tips which give the prevailing hue. A most obviously distinct species from *S. CERULESCENS*.

We suspect that *S. Griffithii*, Horsfield, of that naturalist's Catalogue of the specimens of mammalia in the Hon'ble Company's museum, is no other than our presumed *MURINUS* from the Arakan and Khásya hills; although described from Afghanistan: because we saw a fine skin from Cherra Punji in the possession of the late Mr. Griffith, which was forwarded to the India-house by Mr. McClelland; and we have previously had occasion to remark that specimens of reptiles procured by Mr. Griffith in Afghanistan and

in the Khásya hills, had manifestly become mixed and confounded ; whence certain important mistakes concerning habitats.* *S. Griffithii* is described to be affined to *S. MURINUS* ; "but differing essentially by the uniform deep blackish-brown tint, and the shortness, delicacy, and softness of the fur. Colour deep blackish-brown throughout, with a slight rufous reflection in a certain light. Length of head and body, $5\frac{1}{4}$ in. ; tail, $2\frac{1}{2}$ in." Horsfield's Catalogue.

3. *S. SERPENTARIUS*, Is. Geoffroy : *S. kandianus*, Kelaart. Described in *J. A. S.* XXI, 350, from a skin sent by Dr. Kelaart as "the large godown Shrew of Kandy;" though scarcely corresponding with his indications, *J. A. S.* XX, 164, 185. A second skin of precisely the same species, and also an adolescent specimen entire in spirit, were subsequently forwarded from Mergui by Capt. Berdmore, as noticed in XXII, 412. In both adults, the tail (vertebræ) measures $2\frac{1}{2}$ in. ; and the head and body (allowing for some extension of the skin) about $4\frac{1}{2}$ in. "The Kandyan specimen is more rufescent than the others ; but we can perceive no further difference whatever : indeed, to judge from the two Mergui examples, it would seem that this animal becomes more rufescent with age. Dr. Kelaart states that its odour is as offensive as that of the large Musk Shrew of Ceylon. The Coromandel coast and the Mauritius are given as its habitats. Colour duskyish-grey, with dark rufous-brown tips to the fur, more or less developed according to age, and the under-parts somewhat paler.

4. *S. SOCCATUS*, Hodgson, *Ann. Mag. N. H.* XV, 270. A Sikim specimen which we refer to this species, bears considerable resemblance to the last, but is a good deal darker, with well clad feet and tail ; and the head and limbs are proportionally larger. Entire length of skull with front teeth *in situ*, $1\frac{5}{6}$ in. ; breadth $\frac{9}{16}$ in. (nearly) : entire range of upper teeth, $\frac{5}{8}$ in. : ditto of *S. SERPENTARIUS*, barely exceeding $\frac{1}{2}$ in. Tail (vertebræ), $2\frac{3}{16}$ in. ; compressed towards tip, which is furnished with a pencil-tuft of stiffish hairs. Mr. Hodgson thus describes his animal. "Size and proportions of *S. NEMORIVAGUS*, H. (nearly) ; but distinguished by its feet being clad with fur down to the nails, and by its depressed head and tumid bulging cheeks (mystaceal region). Ears large and exposed.

* Vide *J. A. S.* XXII, 413.

Colour a uniform sordid or brownish slaty-blue, extending to the clad extremities. Snout to rump $3\frac{1}{2}$ in.; tail $2\frac{1}{2}$ in.; planta $\frac{13}{16}$ in. This animal was caught in a wood plentifully watered, but not near the water. It had no musky smell when brought to me dead.”
Hab. Nepal and Sikim.

5. *S. NEMORIVAGUS*, Hodgson, *Ann. Mag. N. H.* XV, 269. Differs from the ordinary type “by a stouter make, by ears smaller, and legs entirely nude, and by a longer and more tetragonal tail. Colour sooty-black with a vague reddish smear; the nude parts fleshy-grey. Snout to rump $3\frac{1}{2}$ in.; tail 2 in.; planta, $\frac{11}{16}$ in. Found only in woods and coppices.” Nepal. According to Dr. Gray, an example presented to the British Museum by Mr. Hodgson, as of this species, “is probably only a half-grown specimen of *S. MURINUS*” (*i. e. CERULESCENS*)!*. The foregoing description should indicate a very different animal; but which might be mistaken for the young of *S. MURINUS (verus)*, and such probably is the supposed *S. MURINUS* from Nepal of Dr. Horsfield’s Catalogue.

6. *S. HETERODON*, nobis, *n. s.* Very similar to *S. SOCCATUS* in general appearance, but less dark-coloured, with shorter fur, and pale instead of blackish feet and tail underneath: the feet, too, are broader, especially the hind-feet; and they have a hairy patch below the heel. The skull, of the same length as in *S. SOCCATUS*, and with equally large teeth, is much more narrow, and the upper quasi-incisors are conspicuously less strongly hooked than in that and other typical *SORICES*. From Cherra Punji, in the Khásya hills.

7. *S. NIGER*, Elliot; described in Dr. Horsfield’s Catalogue (1851). “Length of the head and body $3\frac{1}{2}$ in.; of tail $2\frac{1}{2}$ in. Tail equal in length to the entire animal, exclusive of the head; gradually tapering to a point. Snout greatly attenuated. Colour blackish-brown, with a rufescent shade to the upper parts: abdomen greyish. From Madras” (*Qu. Madras Presidency?*).

* We made a description of the identical specimen, before it was taken by Mr. Hodgson to England: viz.—“Of a shining rufescent-brown colour, merely weaker on the under-parts. Length $3\frac{1}{2}$ in.; of tail $1\frac{7}{8}$ in.: fore-feet and claws $\frac{7}{8}$ in.; the claws alone $\frac{1}{2}$ in., and of a yellow colour, perhaps whitish in the fresh animal: hind-feet and claws $\frac{5}{8}$ in.”

8. *S. FERRUGINEUS*, Kelaart, *J. A. S.* XX, 185 : *S. montanus* apud nos (misled by a label), *ibid.* 163, vide XXI, 350, note. Hab. Ceylon. *N. B.* The dimensions of the specimen described in *J. A. S.* XX, 163, accord with those assigned by Dr. Kelaart to the next species ; and he states that the two are nearly of the same size, and that the smell of the present species is very powerful.

9. *S. MONTANUS*, Kelaart (*nec apud nos*, *J. A. S.* XX, 163). “ Length of head and body $3\frac{3}{4}$ in. ; of tail $2\frac{1}{4}$ in. ; of hind-foot $\frac{2}{3}$ in. Fur, above sooty-black, without any ferruginous smear ; beneath lighter-coloured : whiskers long, silvery-grey : lower part of legs and feet greyish, clothed with appressed hairs. Claws short, whitish. Ears large, round, naked ; the outer margin lying on a level with the fur of the head and neck, and being thus concealed posteriorly.” Mountains of Ceylon (“the blackest Shrew of the highest parts of the island.”) Kelaart.)

N. B. Dr. Kelaart has lately forwarded an entire specimen in spirit of a *young* female Shrew found at Galle (!), though with the three pairs of inguinal teats well developed ; which may prove to be the young of *S. MONTANUS*, but is perhaps distinct and new. If so, *S. KELAARTI*, nobis. Colour uniform blackish above and below, slightly grizzled and glistening ; the fur short and close, with scattered fine long hairs throughout (as described of *S. MONTANUS*). Length of head and body $2\frac{3}{4}$ in. ; of tail $1\frac{1}{4}$ in. ; and of hind-foot with claws $\frac{5}{8}$ in.

10. *S. PYGMÆUS*, Hodgson, *Ann. Mag. N. H.* XV, 269 : *nec S. pygmæus*, Pallas ; if the small European species referred by Schinz, Rüppell, and others to the latter be correctly identified. *S. PYGMÆUS*, Pallas, apud Schinz, is placed by the latter zoologist among the species with brown-tipped teeth, and in the division of them which corresponds to *CORSIRA*, Gray ; and the description—*caudâ basi constrictâ ; auriculis brevissimis* ;—will certainly not apply either to Mr. Hodgson’s animal, or to various other minute Indian Shrews hitherto undistinguished from it : and therefore Mr. Hodgson’s name for the present species may stand, as he states the structure of the animal to be typical.* The following is his descrip-

* Since writing the above, we have seen the figure of *SOREX PYGMÆUS*, Pallas and Laxmann (*S. minutus*, L., *S. exilis*, Gmelin, and *S. minimus*, Geoff.), in the

tion—" Snout to vent, less 2 in.: tail, $1\frac{3}{16}$ in.: head, $1\frac{1}{8}$ in.: palma, $\frac{1}{4}$ in.: planta, $\frac{3}{8}$ in. Structure typical, save that no odorous glands were detected, nor had the animal any musky smell. Colour sooty-brown, paler below. Naked parts of a dusky fleshy hue. Hab. Nepal, where it " dwells in coppices and fields, and is rarely found in houses."

Of numerous specimens of minute SORICES, from various localities, the only one which approaches to the above description is a species which we have just procured in Calcutta; curiously enough while engaged in the investigation of this particular group. It may be termed

11. *S. MELANODON*, nobis, n. s.: from the remarkable colouring of its teeth, which are *pieceous* and *white-tipped*; exhibiting thus the reverse coloration of those of *CORSIRA*, &c. Length of adult female $1\frac{7}{8}$ in.; tail $1\frac{1}{16}$ in.: hind foot and claws $\frac{5}{16}$ in. Colour uniform fuscous, without any rufous tinge; scarcely paler below: the feet and tail subnude, save the usual scattered fine long hairs upon the latter; and, with the ears and snout, of a livid colour, paler below: claws white and distinctly visible. Procured by one of our museum assistants in his own house, where he states that he has observed and can probably obtain others.

12. *S. MICRONYX*, nobis, n. s. Length of head and body $1\frac{5}{8}$ in.; tail somewhat exceeding $1\frac{1}{8}$ in.: hind-foot and claws, $1\frac{3}{16}$ in.: skull $\frac{1}{2}$ in. Teeth white. Claws with fine hairs impeding them, and so minute as to be scarcely discernible without a lens. Fur of a paler and more chesnut brown than any other of these minute species examined, and also more silvery below. Feet and tail subnude, or thinly furred, shewing the colour of the skin through; browner above, whitish (or perhaps flesh-coloured) below. Of two specimens in our museum, one in spirit, the other now dried, the latter was obtained by the late Major Wroughton in Kemáon, the former by L. C. Stewart, Esq. of H. M. 61st foot, at Landour; where he informs us that he picked up many of them dead, on the surface of the snow, during the severe winter of 1850-51.

Act. Acad. Leop. Vol. XIII, pt. 2, t. 25 (1827); and the species is widely different from all the pygmy Shrews here described, and is evidently a CORSIRA.

13. S. PEROTTETII, Duvernoy, Guérin's *Mag. de Zool.* 1842, livr. 8. We can only refer to Prof. Schinz's description of this species, which is as follows:—" *S. notæo saturate fusco-nigricante, gastræo canescente, artibus pedibusque pilosis, auriculis magnis, conspicuus. Long. corporis 1" 4", caudæ 11."*" From the Nilgiris. We have a Darjiling female which approximates this description, and may prove to be of the same species. Head and body $1\frac{1}{2}$ in.; tail 1 in.; hind-foot and claws $\frac{1}{3}\frac{1}{2}$ in. Skull somewhat exceeding $\frac{1}{2}$ in. Teeth white. Colour uniform brown, with a slight tinge of chesnut; and scarcely paler below. Feet and tail distinctly furred, besides the usual scattered long hairs on the latter. Claws whitish and conspicuous. Tail brown above, pale and perhaps flesh-coloured beneath; more probably, however, of a livid hue; and tapering evenly throughout. If new, S. HODGSONII, nobis.

14. S. NUDIPES, nobis, n. s. Remarkable for its naked feet and very large ears; also for the odoriferous glands on the sides being strongly developed, whereas we can detect them in no other of these minute species. Length of female, $1\frac{3}{4}$ in.; tail, $1\frac{1}{16}$ in.: hind-foot, $\frac{1}{3}\frac{1}{2}$ in. Ears conspicuously larger than in the others: tail almost nude, save of the scattered long hairs: and the fore-feet and toes of the hind-feet are conspicuously naked, and apparently flesh-coloured. Fur uniform brown above (like the back of *COR-SIRA VULGARIS*), a little grizzled and glistening; the lower-parts with a silvery gloss: tail brown above, pale (probably flesh-coloured) below; somewhat thick and uniformly tapering. Specimen procured at Amherst (Tenasserim provinces).

15. S. ATRATUS, nobis, n. s. Of this we have only a headless specimen, which was found impaled upon a thorn by some Shrike,* at Cherra Punji in the Khásya hills: but the species is obviously distinct from all the preceding. It is remarkable for its very dark colour, extending over the feet and tail, which is even *blackish underneath*. Length of tail 1 in.; and of hind-foot $\frac{1}{3}\frac{1}{2}$ in. Fur black-

* The same fact we have observed in England of *LANIUS COLLURIO* and *COR-SIRA VULGARIS*: these diminutive Shrews falling an easy prey to the "Butcher-birds;" while the larger members of the same genus are ferociously predatory upon any hapless birdlet they may chance to seize,—as is likewise the case with Moles and doubtless other *SORICIDÆ* of adequate size and strength.

ish-brown above, a little tinged rufescent, and with dark greyish underneath; the feet and tail conspicuously furred, besides the scattered long hairs upon the latter.

Here may be noted, that the Society formerly possessed a specimen of one of these minute Shrews, which was found in a cellar in Madras, and was presented by Walter Elliot, Esq., Madras C. S. We formerly considered it identical with *S. MICRONYX*; so that it could scarcely be so with *S. MELANODON* of Bengal: it was, however, darker than *S. MICRONYX*; and more probably *S. PEROTETTII (verus)*, if not distinct from the whole of the foregoing. It is even probable that several more Indian species of these most diminutive of all mammalia remain to be discriminated. Upon minute comparison of five specimens in our museum, taken out of spirit and carefully dried for the occasion, we immediately detected four well-marked species, and presently afterwards obtained the *S. MELANODON* fresh. It may further be remarked, that we once found the nearly digested remains of an adult small white-toothed *SOREX*, rather larger than a common Mouse, in the stomach of an *ELANUS* which was shot on the banks of the Hugli, about 50 miles above Calcutta: but we have since in vain sought to procure the species.

Another form of white-toothed Shrew, with thick and tapering tail having scattered long hairs upon it, is exemplified by

FEROCLUS, Kelaart. Teeth small; the upper quasi-incisors shorter and less strongly hooked than in restricted *SOREX*, with the posterior spur large; the lower quasi-incisors serrated, shewing two depressions, and therefore a row of three coronal points: four small upper praemolars preceding the *carnassiez*, the two medial being of equal size, the first rather large, and the fourth small. Feet remarkably large. The ear-conch scarcely visible above the fur.

16. **F. MACROPUS**: *Sorex feroculus*, Kelaart; *S. macropus*, nobis, *J. A. S.* XX, 163. Length about $6\frac{1}{2}$ in., of which the tail is $2\frac{1}{4}$ in.: hind-foot with claws nearly $\frac{2}{3}$ in.; the fore-foot $\frac{1}{4}$ in. broad, with long and but slightly curved claws, that of the middle digit $\frac{1}{2}$ in. in length. Fur somewhat long and very soft, uniform blackish, very faintly tinged rufescent; the extreme tip of the tail naked and of a flesh-colour. Inhabits Ceylon.

Another white-toothed Indian Shrew exists in the *CROSSOPUS HIMALAYICUS*, Gray, to be noticed presently. We feel much doubt of its being correctly referred to *CROSSOPUS*.*

The greater number of small Shrews inhabiting the temperate regions of Europe, Asia, and N. America, have the teeth always tipped with ferruginous or pitch-colour, a slender Mouse-like tail with no scattered long hairs upon it, and (save in *OTISOREX*) the ear-conch concealed amid the fur. There are two distinct types of dentition.

In one, the upper quasi-incisors are much longer than their posterior spur (as in restricted *SOREX*) ; and the lower have but a single posterior spur more or less rudimental : the lateral small teeth which follow in the upper jaw are four in number (as in restricted *SOREX*) ; the first two being equal, the third somewhat smaller, and the last (as usual in all Shrews) minute. With this type of dentition, we distinguish

1. *SORICULUS*, nobis. With the hind-feet of ordinary form and proportions, unadapted for aquatic habits ; and the tail tapering and a little compressed at its extremity.

17. *S. NIGRESCENS*; *Corsira nigrescens*, Gray, *Ann. Mag. N. H.* X, 261, (1842) : *Sorex sikimensis*, Hodgson, Horsfield's Catalogue, (1851). Length of head and body, $3\frac{1}{4}$ in. ; of tail, $1\frac{1}{2}$ in. : hind-feet and claws, $\frac{5}{8}$ in. Number of caudal vertebrae, 15 (besides the extreme tip). Colour throughout blackish, a little tinged with rufous ; the feet and claws pale. Very common in Sikim ; and was formerly sent by Mr. Hodgson to the Society's Museum and also to the British Museum from Nepal.

2. *CROSSOPUS*, Wagler (v. *Hydrosorex*, N. Duvernoy, and *Pinalia*, Gray). With the hind-feet large and ciliated, and the tail also compressed and ciliated beneath towards its extremity ; in adaptation to aquatic habits. *N. B.* *S. FODIENS*, (v. *hydropilus*), Pallas, and other Water Shrews of Europe and N. America constitute the types of this division ; and Dr. Gray refers to it a Himalayan species, which, having *white teeth*, we very much suspect will

* *MYOSOREX*, Gray, is founded on a Cape species, the *SOREX VARIUS*, Smuts, with ear-conch concealed amid the fur, and a slender tail (without scattered long hairs?) : the teeth white, and the dentition slightly modified upon that of restricted *SOREX* : lower quasi-incisors "with an entire sharp upper edge."

prove to differ in other and more important particulars ; even though it may exhibit the *adaptive* characters of an enlarged and ciliated hind-foot and compressed and ciliated tail-tip. It is thus described.

18. CR. HIMALAYICUS, Gray, *Ann. Mag. N. H.* X, 261 (1842). "Length of head and body $5\frac{1}{2}$ in. ; tail 3 in. : hind-foot $\frac{3}{4}$ in. (nearly). Slate-coloured black, with scattered long hairs, which are longer and white-tipped on the sides and rump : lower part of the throat and the middle of the belly rusty-brown : tail elongate, scaly, with appressed dark brown hairs above and elongate rigid whitish hairs beneath, and brown elongated rigid hairs near the tip : feet rather naked : whiskers numerous, elongate, brown. *Teeth white.*" Probably from the neighbourhood of Simla or Masuri.

In the other type of dentition the lower quasi-incisors are distinctly serrated, with three or four coronal points ; and the anterior point of the upper quasi-incisors is not prolonged beyond a level with its posterior spur : the lateral small teeth which follow in the upper jaw are five in number, and diminish gradually in size from the first backward. Tail cylindrical, not tapering, and furnished with a stiffish brush at its extremity. Such is the common British land Shrew, S. VULGARIS, L. (formerly confounded by British writers with S. ARANEUS, Schreber), and which is the type of CORSIRA, Gray (v. *Amphisorex*, No. 1, Duvernoy, apud Gray). There are many other species.* We refer to it doubtfully.

19. C. (?) CAUDATA ; *Sorex caudatus*, Hodgson, Horsfield's Catalogue (1851) : for the description seems to indicate a species closely affined to the European S. ALPINUS, Schinz ; a skull-less example of which, from Mt. St. Gothard, is in our museum ; and S. ALPINUS is ranged among the species having the CORSIRA type of dentition by Prof. Schinz in his *Synopsis Mammalium* : its tail, however, is naked and compressed at tip. "Length of the head and body $2\frac{1}{2}$ in. ; of the tail the same, slender, nearly naked, and very slightly at-

* BLARIA, Gray, (v. *Blarina*, Lesson), is founded on S. TALPOIDES, Gapper, *Zool.-Journ.* V, 28, referred by Blainville to S. BREVICAUDUS, Say ; a N. American species, which, we believe, only differs from CORSIRA in the large size of its fore-feet, and in its very short tail :—and OTISOREX, Dekay, is founded on two minute N. American species, which do not appear to differ from CORSIRA except in having the ear-conch large and conspicuously visible above the fur.

nuated. Colour saturate blackish-brown, very slightly rufescent in certain aspects. Snout moderately elongated, furnished at the sides with long delicate hairs."

We now conclude this effort at a *Conspectus* of the Indian SORICINE, by soliciting aid from all (probably not many persons in India) who take any interest in the subject. It will suffice if specimens could be sent in spirit to the museum of the Society (if disembowelled, and the abdominal cavity cleaned of blood, so much the better for our present purpose, except with regard to the very diminutive species, examples of which are particularly acceptable); such being far preferable to badly prepared skins for being afterwards set up as stuffed specimens, besides permitting of much more satisfactory examination of their differential characters; and it is further desirable that three or four adults of each kind should be thus transmitted, to supply our collection with skeleton and stuffed specimens, in addition to at least one to be retained entire in spirit. The *micro-mammalia*, as they have been designated (as Bats, Shrews, Mice, &c.), require to be thus amply represented in museums, for their specific distinctions to be rightly understood in many cases: and the chaos of Indian MURIDE, in particular, will never be reduced to systematic order, with the synomynes correctly adjusted, until such a tolerably complete collection of them from all quarters has been brought together.

*Bibliographical Notes on the published Upanishads with suggestions upon the publication of those which remain unedited.—By E. RÖER,
Esq. M. D.*

Since the publication of Mr. Walter Elliot's letter of the 30th August, 1851, in the 20th volume of the Society's Journal, p. 607, announcing, that the lists of Upanishads, as received among the Telingána Pandits contained many, not to be found in Colebrooke's or Weber's lists, and that copies of them were yet procurable, I have received from him a complete set of all those Upanishads the existence of which we learn only from his list. Written in the Telingána character, they are now in the course of being transcribed into the

Devanagari. I subscribe a list, containing the number of pages in each.

1. Gopála tápaníya Upanishad,	1—6
2. Gopála Uttara tápaníya U.....	9—19
3. Tripura Tápaníya U.	21—44
4. Tripura U.	45—47
5. Skanda U....	49—50
6. Darsaṇa U.	53—73
7. Vajrasúchiká U.	75—77
8. Atmabodha U.....	79—82
9. Amritanáda U.....	83—86
10. Paingala U.	87—108
11. Nirálamba U.	109—113
12. Taittaríya U.	117—186
13. Adhyátma U.	189—197
14. Adwaitatarka U.....	199—204
15. Akshamáliká U.	205—211
16. Akhsí U.	213—219
17. Annapúrná U.....	221—256
18. Avadhúta U.....	257—260
19. Avyakta U.	261—268
20. Bahwrich U.....	269—270
21. Brahmajábála U.	271—284
22. Bhávaná U.	285—288
23. Bhikshu U.	289—290
24. Brihajjábála U.....	291—310
25. Dakshinámúrti U.	311—314
26. Dattátreya U.	315—319
27. Deví U.	321—324
28. Ekáks'hara U.	325—326
29. Gaṇapati U.	327—329
30. Hayagríva U.	331—334
31. Jábáli U.	335—337
32. Kalisantarana U.	339—340
33. Kaṭha U.	341—346
34. Krishṇa U.	347—349
35. Kunḍinaka U.	351—354

36.	Mahávákyá Ratnávalí U.	355—410
37.	Mahávákyá U.	411—412
38.	Maitreyí U.	413—420
39.	Maṇḍala Bráhmaṇa U.	421—431
40.	Mantraka U.	433—434
41.	Mudgalá U.	435—439
42.	Muktiká U.	441—456
43.	Náradá parivrájaka U.	457—504
44.	Nirwáṇa U.	505—507
45.	Parabrahma U.	509—514
46.	Panchabrahma U.	515—518
47.	Paramahansa U.	519—521
48.	Rahasya U.	523—529
49.	Ráma Rahasya U.	531—548
50.	Rudraḥridaya U.	551—554
51.	Rudra Jábála U.	555—561
52.	S'áṇḍilya U.	563—585
53.	S'arabha U.	587—591
54.	Saraswati Rahasya U.	593—599
55.	S'áriki U.	601—603
56.	S'átyayaníya U.	605—610
57.	Sávitri U.	611—613
58.	Sítá U.	615—620
59.	Saubhagya Lakshmí U.	621—625
60.	S'abala U.	627—645
61.	Súrya U.	647—649
62.	Tárasára U.	651—654
63.	Trisikhabrahma U.	655—672
64.	Turiyátita U.	673—675
65.	Varáha U.	677—702
66.	Vasudeva U.	703—706
67.	Yájnavalkya U.	707—711
68.	Yogachúḍámaṇi U.	713—721
69.	Yogakunḍalí U.	725—740
70.	Maitrayani U. Várṭtika,	
71.	Kaushitaki U. Várṭtika,	

To this list is to be added the Kaushitaki Upanishad with S'ankara's commentary, with which Mr. Elliot favoured me but lately. The first twelve Upanishads of the above list are also mentioned by Dr. Weber; all the others from No. 13, with the exception of Nos. 21 and 33, are new to us.

The whole number of Upanishads, as far as we know at present, is 138 (v. J. of the As. S. XX., p. 619). Of eleven only has the text been published, viz. 1. The Brihad Āraṇyaka. 2. The Chhāndogya. 3. Katha. 4. Kena. 5. Mundaka. 6. Māṇḍukya. 7. Pras̄na. 8. Is'ā. 9. Aitareya. 10. Taittariya and 11. S'vetāśvatara. This number is indeed but small, at the same time it includes almost all the most valuable. The importance of the Upanishads depends upon the date of their origin and upon the influence which they exercised in the formation of the systems of philosophy among the Hindus. According to the received definition, the Upanishads are such parts of the Vedas as embody their metaphysical and theological view which may be compressed into the formula, that the finite soul is essentially the same with the infinite spirit or Brahma. The Vedas themselves were written at different times, the Atharva Veda being the most modern one, so that as a rule the Upanishads of the Atharva Veda were composed later than those of the other Vedas, and in consequence do not exhibit the doctrine in the same originality and simplicity as those of older date. According to the theory laid down in the Mahāvākyā Ratnāvalī, (e. l. 612-613) there are 1,180 Upanishads equal to the number of Vedaic schools, one Upanishad belonging to every school. This theory is, however, fanciful, and not borne out by fact, and even the Ratnāvalī admits, that 108 Upanishads are the principal ones, which it enumerates and making no mention of any other, probably because the author did not know of any more.

As to the doctrine of the Upanishads, it appears even on a casual glance, that they widely differ from each other, some of them exhibiting the most ancient philosophical dogmata preserved among the Hindus, others in many of their leading tenets representing a more modern epoch, their only connexion with the ancient Upanishads being, that both maintain the identity of the finite and infinite spirit. Colebrooke would acknowledge only those works as Upan-

nishads which were written at the time of the Vedas. Weber opposes this view on the ground, that later tracts, if explanatory of the same doctrine, cannot be excluded, since the term "Upanishad" is not confined exclusively to the Vedas. Colebrooke's view coincides with the opinion of Hindu authors, and therefore seems to us for this as well as other reasons the preferable one, could we ascertain, which Upanishads are contemporary with the Vedas and which of later origin; to determine this point, however, in the present state of our knowledge is not possible. Our only course, therefore, is, preserving the name, "Upanishad" for all, to classify them according to their importance in the sense above pointed out.

Dr. Weber divides the Upanishads into the following classes,

1. The Upanishads which belong to the three first Vedas, as forming the foundation of the Vedánta system; with a subdivision into A, such as are found exclusively in those Vedas, viz., the Vashkala, Kaushitaki, Aitareya, Tadeva, S'atarudrīya, Chakli, Maitrayani, S'vetás'wata, S'ivasamkalpa, Purushasúkta, Isá, Brihadáranyaka, and Chhándogya, and B, into such as also occur in the Atharva Veda, viz. Kena, Kaṭha, Ānanda Vallí, Bhrigu Vallí and Mahá Náráyaya.
2. The second class comprises all the Atharva Upanishads referring to the Vedánta system in its entire development, and their order is as follows. a. The Muḍaka, Pras'na and Garbha which are pretty closely connected with the former period, and still treat general questions of the Vedánta. b. The second division is made up of such as have a special reference to the topic of the nature of the Ātman, as S'arva, Yogas'ikhá, Ātman, Ātmabodha, Tejovindu, Churiká, Chuliká, Amritanáda, Aks'hi. 3. The third division is composed of the Upanishads in which the meditation has become crystalised and is limited to the mystical word "Aum" ex. g. the Dhyánavindu, Yоготат्त्वा, Atharvas'ikhá, Hansanáda, Brahmarvidyá, Mánḍukya, Táraka, Prána, Saunaka. 4. Closely allied to the former division is the fourth, which treats on the order of the Sanyasi, as Jábála, Paramahansa, Aruneya. 5. The last division includes the sectarian Upanishads, in which the Ātman is worshipped as an individual deity.

As the more simple course we propose to adopt three divisions, viz., 1. The Upanishads which are referred to by the six orthodox

systems as their source. There appears no reason, either on account of doctrine or priority of age, to restrict this head or class to the Vedánta system; for the others claim equally to be derived from the Upanishads, and the Vedánta Sútras in their present form are by no means the most ancient among the philosophical Sútras. 2. The more modern Upanishads, which are not referred to in the Sútras, and which contain the same doctrine as those of the former division, but more developed. 3. The Upanishads which are different in doctrine and refer to the worship of a special deity, as Deví, Krishṇa, etc. These are all most modern.

With regard to the first class, it is in most cases difficult to determine, which are the Upanishads, alluded to by the authors of the philosophical Sútras, as they do not quote whole sentences of the Upanishads, but refer to names and words, which for the most part occur in several Upanishads. And when proceeding to decide this point by critical examination, we must bear in mind that those Upanishads are the best representatives of the philosophy of the Vedas which are commented on by S'ankara. These are, besides the eleven stated above as published, the Nrisinha, Tápaníya, the Kaushitaki, the Atharvasikhá, the Atharvasiras and the Maitrayaní Upanishads. Of the text of the Kaushitaki Upanishad as well as of its commentary by S'ankara, MSS. are very rare; at Benares even they appear not to be procurable, and the MS. of the text with S'ankara's commentary, committed to my care by Mr. Elliot, is therefore a very valuable contribution to our knowledge of the literature of the Upanishads. Of the others, MSS. are everywhere procurable, and these five Upanishads, together with the commentary of S'ankara, have a paramount claim to be published in the *Bibliotheca Indica*.

Next to them in importance range the 52 Upanishads of the Atharva collection. Although several of these (the Katha, Kena, Ananda Vallí, Bhrigu Vallí, Muṇḍaka, Práṇa and Mánḍukya, have been published, yet their number is comparatively but small, and, in my opinion, the text of all should be printed, as the whole collection would not occupy more than 150 to 200 pages.

The abovementioned Upanishads being published, I have no doubt, that an edition of those which remain will soon be called for as essential to complete our acquaintance with this interesting department of ancient learning.

It is to Mr. Elliot that we owe the preservation of a great part of the literature of the Upanishads, and I take this opportunity of publicly acknowledging to him my most grateful thanks for the ready generosity with which he has, upon several occasions, placed at my disposal MSS. of infinite importance to my labours in this field of research.

Literary Intelligence.

Extract from a letter of Dr. A. SPRENGER, dated Damascus, December 24th, 1854.

And now I come to bibliography. In my opinion the most important book that I have yet seen is one, of which probably no one else would have taken notice. It has the title of دواد القلوب و معرفة همم وادبة النفس وادبة and contains instructions of a Pyr to his pupil. The Pyr is the celebrated Abú 'abd Allah al-Háirth b. Asad Mohásiby-died in 243. His biography is in the Nafahát in Qoshayzy, in Asnawy's Tabaqát, &c. and the disciple is the not less celebrated Qúfy Ahmad b. 'ásim Avitázy. The first fifty pages contain questions of the pupil and answers of the Pyr on moral and metaphysical questions. The dialogue is managed with great skill and perspicuity. The rest of the book, about 400 pages, contains traditions of Mohammad as well as of other great persons of the first century of the Islám, and abounds in historical anecdotes, most of which are very valuable, for the history of civilization. The moral sentiments expressed in the work are sound and what struck me most is the democratic tendency of the author, which we find in no other work of the Musalmáns. This is the most ancient book on Sufism known, and in so far very valuable, for the history of this science; the copy is dated A. H. 486. Bound with it and written in the same hand and consequently also of A. H. 486 is a translation from the Greek of four small books ascribed to Enoch. I do not know whether they are identical with those lately translated from the Coptic. They contain exhortations to a pious life, invective against the rich

and the praise of poverty and abstemiousness, and they are therefore also of some interest for the history of Súfism. The date of the translation is not mentioned, but it must be old. It is in rhymed prose, and the language is very peculiar and hardly intelligible.

I am particularly rich in commentaries on the Qorán. Before I left Calcutta I obtained eight volumes (out of ten which compose the whole work) of the *Tafsyr* of Hákím (see *Hájy Khalyfah vóce Tahdzyb.*) Here I found in the possession of Mr. Barnett, a Missionary, a book which I so often wished to have—an account on which occasion the works of the Qorán have been revealed. There is a work on the subject by Soyúty, for which I have made much search, but in vain. But the principal book is the *اسباب نزول القرآن* by Wáhidy (I believe he died in 468.) He gives in all instances the authenticated opinion of the contemporaries of the prophet, and a full account of the circumstances under which a verse was revealed. This will enable me to make the Qorán more fully bear on the biography of the prophet, than could otherwise have been done. Another work of equal or even greater importance is the در المنشور في التفسير المأثور. The author's name is cut away, he says that he had written the *ترجمان القرآن* and that he made now a new edition of it in which he omitted the *asnád* with a view of reducing the extent of the work. This book consists, exclusively, of traditions bearing on the explanation of the Qorán. Even if the traditions are not all genuine, we have at all events the views which were taken in the first century of the Hijrah, on the meaning of the sacred code. I have unfortunately only about one-fourth of the work, and it fills near a thousand pages, small folio. The above two titles will enable me to find the name of the author and date in *Hájy Khalyfah* or in Soyúty's *Tábaqat al mofassiryn*. I have none of these two books at hand. How much more valuable such a work is—or in fact any *tafsyr*—than the disgusting dialectical discussions of Dámkhshary, and his contemptible abbreviator Baydhawy or of Imám Rází!

Good *tafsyrs* are very large and consist generally of more than twenty volumes. To find complete copies is out of the question. I therefore act on the conviction that the first centuries of the Islám—when complete works were to be had—will never return, and

take what I find, particularly if the MSS. are old. I have the eighth and last volume of the *زاد المسير* of Tan al Jawzy (d. 597), one out of about twenty volumes of Kortoby, and about twenty portions of other commentaries—some of the fourth century. I also have nearly a complete copy of the historical commentary of Sohayly (d. 581) which is short, but exceedingly valuable, the title is *تعريف و اعلام لما أبِّهم فِي القرأن من الامْسَا وَ الاعْلَم*

In speaking of Sufism I ought to have mentioned Ooshayry (d. 465) and his book being the groundwork for the history of this science. I have already two most beautiful copies at Calcutta, and here I found a third one; it is incomplete, but old.

The science on which all our enquiries into the early history of the Islám must be based, is the *علم اصول الحديث*. The book in common use on it, is the Ibn Hajar's *Nakhjá* with commentary; I have two copies of it in India, but it appeared to me always very unsatisfactory. In our Society is an excellent copy of the Alfyyah with a very large commentary which is much more full. Here I found Nawowy's *تقريب و تيسير* which is very useful. He refers to a larger work of his called *ارشاد* of which this is an abridgment, but the Tishád 'Aurf he says is an abridgment of the work of Ibn Galáh (born 577, died 643.) This is the work to get hold of. I have the *منظومة الاشباعي* on the subject with two complete commentaries, one of which is dated 962, but the book is hardly more valuable than the unsatisfactory notices in the preface to 'Abd al-Haqq Dihlawy's *Mishkát*, or those in the introduction to the Dilly edition to Ter-midzy or those in the *Sifr alsá'aídát*. Of much more value is the *شرف اصحاب الحديث* by Abu Bakr Ahmad b. 'alyy b. Thábit b. Ahmad b. Mahdiy of the sixth century. He gives the opinions of the ancients on the subject, quoting his *asnád* in full. Unfortunately I have been able to obtain only a small portion of it. Among works, containing traditions, I met with one volume of Bayhaqy; he is so often quoted that I had very great expectations, but as it contained merely traditions bearing on prayers, I was much disappointed. More important—for me at least—is the *Moçannaf* of Abú Bakr 'abd Allah b. Móhd b. Aby Shaybah 'absy. The eighth volume of the *السفر الثامن* (a very thick one) is in the Syrian Society, and contains upwards of 100 pages bearing on the Campaigns of Mohammad. I do not

know the date of the author, but he is older than the Bokháry, and his accounts are of importance, because he gives for every fact his sanad like Wáqidy, whereas the asnád for the *details* of the Campaigns are generally omitted by Ibn Isháq and even by Ibn Sa'd. Another work of some value on traditions is the فواید المتنقاۃ of Abú-l-Qásim 'abd Allah b. Mohd b. 'abd al'aazyz who lectured on the book in 315. I have unfortunately only the tenth part of it, but the copy was written in 407. In the commencement of the MS. (as is generally the case in ancient books on traditions) is the sanad of the copyist—Abú-l-Makárim Mohd b. al-Hosayn b. 'abd al'aazyz Ibn Wahbán—up to the author, viz.

خبرنا الشيخ الأجل ابو جعفر محمد بن احمد بن الحسن بن المسلمة
المعدل [بقاء الله] قرأة عليه قال اخبرنا ابو طاهر محمد المخلص قراءة عليه
في جامع المنصور بعد الصلوة للثلاثين من جمادى الاول سنة ثمان وثمانين
وثلاثمائة قال اخبرنا ابو القاسم عبد الله بن محمد بن عبد العزيز قراءة عليه
سنة خمس عشرة وثلاثمائة اخبرنا محمد بن عباد الح

It appears that after the death of the copyist the book fell successively into the hand of other persons, and they severally wrote their asnád in it up to the author and the date when he read it before their Shaykh. In so far the MS. itself is not without interest. I must not fatigue you with too long details on my hobby, particularly as I have an intention to write a separate article on the subject for the *Zeitschrift*.

حسن التقاسيم في معرفة الأقاليم

On geography I have a copy of the *حسن التقاسيم في معرفة الأقاليم* by Shams aldyn Abú 'abd Allah Mohammad b. Ahmad Shámy *Maqdisy Hanafy*, who composed the work in 375. You will probably find a notice of the author in Wüstenfeld's *Geographen* and in Reinaud's translation of Abú-l-Fidá, but perhaps not of the work, for if I am not mistaken, my copy is unique. Unfortunately the proprietor was aware of its value, and I had to give a tremendous price for it. The author assures us, that he has visited most Mohammadan countries, and spent upwards of ten thousand dirhams in travelling. Regarding places which he could not personally visit he did his best to obtain oral information. He also examined as many libraries as he could, and made extracts. With these claims

we may imagine that he speaks very lightly of his predecessors. Abú 'abd Allah Jobhány, he says was Wazyr of the Amyr of Khorásán, and a good astronomer; he gathered much information, among other things, regarding Indian mythology, but his book, he thinks, is too speculative and impractical. The principal object of Abú zayd Balkhy was to give maps and to this end he divided the globe into twenty parts, but the descriptions are, in his estimation, not full enough, as he had seen very little of the world. The same remark applies to Tan-al-Faqyh Hamadany, who enumerates only the large towns. The geographies of Ibn Khordádbah and Jálitz are much too short. In the whole it must be allowed that Maqdisy's work is by far the best arranged and approaches nearer to our notions of geography than any other: thus after the description of the division and cities of a country he gives, under separate heads, an account of the climate شؤون تجارات, productions which are peculiar to it, خصائص as for instance the Adym leather of Zabyd, weights, measures and coins مكاييل ونقد, of the dress and habits of the inhabitants رسمون, of the manner in which towns are supplied with water, and quality of the water المياه معادن mineral productions of the sights and places of pilgrimage مشاهد و منارات, of the political divisions ولايات of customs and other towns duties and the custom-houses الضرائب والمراسيم (this is the most interesting chapter of all) and finally of the distances. Having detailed the merits of the work I must not forget to mention the demerits of the copy. It is about two or three hundred years old and has all the maps. It consists of 236 pp. of 25 lines. But unfortunately the original seems to have been in a bad condition and the copyist had no second copy to supply the deficiencies. In one place nearly a page is left blank with the remark سقط عن الأصل In other places he would not decipher proper names and either he pointed them as he found them in the original or (and in some few instances) he omitted them altogether. Yet the MS. is in the whole correct and contains all the maps. A copy of so rare and valuable a work is under all circumstances a treasure, and even should another one be found, it would hardly sink in value, because it is not to be supposed that it by itself would be sufficiently complete and correct as to enable a man to edit it, and as a help this copy is extremely important.

You may make the following offer to the Society, I will write a very full analysis of the work, in fact a complete translation, to be printed with copious extracts from the Arabic original. I suppose it will fill three numbers of the *Bibliotheca*. Anticipating the sanction of the Society, I commenced my labour at once, because here I have greater facilities. Bound with it, is another work on Geography of a still earlier date—it was compiled under Motadhid billah (reigned from 279 to 289)—but of a very different character. The author was not a practical traveller, but a man of great learning. His book is full of quotations from the earliest and best authors: Kalby, Kinchy, Abú 'abaydah, Wáqidy, Ibn Habyb, &c., and contains many very valuable historical details. I do not know when Ibn al-Faqyh Hamadany lived. If chronology is not against it, I put it down as his work. The book is not unique. There is an inferior copy of it in the India House, I believe, marked with either No. 616 or 628, and an old copy in the British Museum. This ought to be published in the *Bibliotheca*. My copy has been transcribed from a MS. which had been written in 413. I will make arrangements to have it copied out, and after having carefully compared it, I will send it to England in hopes to find some good soul who may join me in editing it and compare it with the two copies there. Kindly mention the subject to the Society and obtain their sanction to the publication.

I am now convinced that the Ashkál albilád is no other work than the original text of Abú Zayd Balkhy, and Istakhry is an abstract, and the صور إبلاد sometimes quoted by Dowlatcháh and known in Europe as the “Ibn Hawqal of Sir W. Ouseley” is a free translation of it. We must, however, ascertain whether Istakhry or Abú Zayd is older. Be so good as to get the German translation of Istakhry and also Robinson’s Biblical Researches for the Society’s library; they may be useful for our purpose. Your wish, which you expressed in your last, that an ancient work on geography be forwarded is partly fulfilled.

In the library of the Syrian Society at Beyroot is a copy of Herawy’s places of pilgrimage and sights, which is of some interest but not new, a copy of it being at Vienna. He visited and described these places in the seventh century. Much more curious is the

Journal of a Moorish traveller in France and Holland. His description of the sights of Paris is very amusing, but the most ludicrous part is his falling in love with a French heiress.

In speaking of Geography, I must not forget to mention two Europeo-Arabic works on the subject. One is a complete translation of Malte Brun, printed in Egypt, in folio. I have seen only the second volume. It seems to be well done. The other is a work, 8vo. about 350 pp. written in Arabic expressly for the use of the natives of this country by Dr. Van Dyek, an American Missionary, and printed at Beyroot. It is extremely well done. He consulted Arabic as well as European sources, and enlivens the subject occasionally with a verse. The language is a compromise between modern and classical Arabic and very idiomatic. A guarantee for the correctness of the style and language is that the poet Naçeff has written it over before it went to press. It would well deserve to be introduced in Mohammadan schools in India. Speaking of this translation I cannot help expressing my esteem for the American missionaries in Syria. Their object is not to found a new sect of Christians among the innumerable sects which already exist in those parts of the world, but to emancipate the Christians from superstitions and other tenets and practices which are either contrary or at all events not connected with religion. They are in fact apostles of civilization, and the consequence is that at Beyroot—their head quarters—and in the Libanon they have enlisted intelligence for themselves. They have not a body of governors, a Committee consisting of Sir John Dunky, the Hon'ble Ass, and similar highly respectable individuals, but they rule themselves, meeting for consultation whenever there may be need, public opinion being their only control. The Americans are too wide awake to use any other than the Arabic language as the vehicle of education, and some of them (particularly Dr. E. Smith) are eminent Arabic scholars. They have printed several Arabic grammars, &c. and contributed much to induce the native Christians (to whom alone they address themselves) to cultivate their mother-tongue. The catholic clergy of the Libanon is obliged to follow their example, and they were establishing similar schools, and what is the most amusing part, they were teaching in them, the books printed by

the Americans. I have sent you on a former occasion specimens of their Arabic type. It is superior to any in Europe or India. You would hardly believe how much Europeanism is advancing at Beyroot, and gradually also in the interior of the country. As an instance, I may mention that there exists an Arabic theatre in that city, in which, of course, almost every night Haroon Arrasheed and Mamoon go over the stage. All that is required here is security of property, which, owing to the rapacity of the rulers, only the people of the mountains enjoy.

I come now to history—the ninth volume of the History of Tabary forms part of the *Bibliotheca Sprengeriana* which rivals with the best public collections of Europe. It commences with the year 32 of the Hijrah, and comes down to the arbitration al Dúmat al-Jandal. This copy was written in 447 by 'aqyl b. Ahmad b. Mohd. b. al-Azrag al-Farrá. The copy consisted of 16 volumes and was in 797 given as waqf to a Madrasah at Cairo, but even the third and tenth volumes were wanting. There is a complete copy of Ibn 'asákir's history of Damascus in this city. It consists of forty volumes in folio each of from 800 to 1,000 pages. The first half of the first volume contains the topography and the general history of Damascus, the remainder of the work is devoted to Biography; the arrangement is alphabetical, at the head however stands the life of the prophet. If we were to look out for the lives of Abú 'abaydah, Khálid, Mo'awiyah, &c., we could put together a most complete history of Syria. Valuable as the work is, it must be allowed that it is unnecessarily incumbered with *asnád*, which the author carries up from his time to the event on which he speaks. There would be no difficulty in obtaining permission to have it copied, and the expense would not exceed £200. But I fear the desire to secure so valuable a monument of the Islám for some European library will only rise when the work is lost. I have seen one volume of the history of the Turkish dynasties by Ibn Habyb' (d. 779) who commences with the year 648 and ends with 677. The book would be all the more valuable if it had not been in rhymed prose. I got here a copy of the first half of the *Syrat Hishániyyah*, which was written by Ibn al 'ajamy, and is the most carefully written MS. I have ever seen. It contains every vowel and, when two

vowels are admissible (as in *Artah* which is also pronounced *Irtah*) both are marked usually with a note in the margin, indicating which of the two readings is preferable, and it contains all the variantes (روابط) and in some instances invaluable historical notes. I have also a very excellent copy of the *Syrat* of 'alyy *Halaby* d. 1091. There exists a work of *Mohibby*, written in the style of *Ibn Khallikán* and containing the *viri illustres* of the eleventh century of the Hijrah. Here it is not very rare, yet expensive, but in Europe I know of only one copy. The work is written with much erudition and after *Ibn Khake* probably the most valuable biographical work in the Arabic language. *Murady* has continued it, giving the biography of the twelfth century. Of his work only one copy exists. Of the شقائق النعمان (literary biography of the Turkish empire) I have been told, copies were frequent but I have been able to secure only one, which is hardly sufficient, for in dates and names we have no means of arriving at correctness, except comparing several good copies. I have been favoured with the loan of *Asrawy*'s biographies of learned Sháfiites (compiled 769 and copied 778) and I made an abstract of it which fills 33 sheets. Subsequently I obtained the loan of *Ibn Qádhiy Shohbah*'s Sháfiite Biography which come down to A. H. 840 and with those of *Ibn Molaqqin* and with the smaller work of *Sabky* on the same subject. *Asrawy* is by far the most erudite among the four works, but the arrangement is bad, and it contains many names which do not deserve to be preserved. *Ibn Qádhiy Shohbah* avoids the latter fault and is fuller in biography, but he wants research. The other two works are mere registers of names and dates. A copy of the first volume of الکمال فی اسماء الرجال is at Beyroot. I had it copied as it will enable us to correct our edition of the *Içábah*. I have also somewhat more than one-third of *Mazzy*'s abstracts thereof. The other day *Manay*'s biography of *Çápés* was offered to me for sale, but at an extravagant price, and it does not appear to me that it is better than *Jámy*'s *Nafahát*, excepting perhaps in regard to Bibliography.



PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JANUARY, 1855.

At the Annual General Meeting of the Society held on the 3rd inst.

Sir JAMES W. COLVILE, Kt. President, in the Chair.

The Secretary read the following

REPORT.

The Council have the satisfaction of again congratulating the Society on its increasing prosperity both in respect of the accession of members and the improvement of its finances.

The number of elections in the past year has exceeded that of any previous year since 1849, and consists of one honorary and twenty-two ordinary members. The loss, during the same period, has been by death six, and by retirement eight, in all fourteen, leaving on the Society's roll 155 ordinary members, of whom only a few are permanently absent from India.

The obituary includes the names of the late accomplished scholar Sir H. M. Elliot, Prof. Jameson of Edinburgh, an old and distinguished honorary member, Dr. J. B. Mill, Dr. N. Wallich, Capt. T. Latter, and Capt. Boys.

The decease of the three members first named has already been specially announced at ordinary general meetings, which, in the case of Sir H. Elliot and Prof. Mill, have recorded resolutions, expressing their sense of the loss thereby inflicted on the cause of Oriental Literature. Capt. Latter was known as an excellent Burmese scholar and as the compiler of a grammar and other elementary works in that language. Capt. Boys had contributed, partly in our jour-

nal and partly in correspondence with men of science in London, to our general knowledge of Indian Entomology.

Finance.

The financial statements annexed to this report will be found to exhibit, after providing for all liabilities, a balance in favour of the Society amounting to Rs. 5,411-14-5. The total receipts for the past year has been Rs. 17,676-5-8, while the expenditure has been Rs. 16,233-9-9, leaving a surplus of Rs. 1,422-11-11, on the year's transactions.

The outstanding assets, though much reduced, still continue heavy, amounting to more than Rs. 9,000. The greater portion of them, however, may be considered as perfectly safe and realizable in course of the current year.

Of the probable income and expenditure for 1855, the following may be taken as a fair estimate.

Income.

Contributions from 132 Resident Members, ...	Rs.	8,448
Government Grants,		7,368
Journal,.....		1,100
Sale of Society's Publications,.....		1,500
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Total, Rs.		18,416

Expenditure.

General Establishment,	Rs.	1,900
Museum ditto and contingencies,		7,920
Journal, 7 Nos.....		1,800
Library,.....		2,000
Miscellaneous, including Building,.....		1,150
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Total, Rs.		14,770

The above estimate does not include the sale proceeds, until last year inconsiderable, of the *Bibliotheca Indica*. The income from this source, having lately much improved, the Council resolved, in August last, to make these proceeds over to the Oriental Fund

to which they strictly belong, in order to meet increasing demands on its resources. But for this measure, the above estimate would have shown an additional income to the amount of 6 or 700 Rs.

Library.

Much has been done in the way of enriching this department and of opening out and preserving the valuable books and MSS. already collected. The greater part of the books have now been placed in glazed cases. The prospect held out in the last report of the publication of a new Catalogue of the Library has not yet been realized, owing to the necessity of getting the whole of the MS. Catalogue re-arranged and re-copied. This work has, however, now been completed, and the Catalogue is nearly half printed. It will probably appear within the next six months.

The Council cannot omit here to notice a valuable accession of nearly 30 volumes received from the Imperial Academy of Sciences at Vienna, including the Transactions and other publications of the Academy.

Musuem.

Several contributions of Zoological and Mineralogical specimens have been received during the year. Among the latter should be mentioned, more especially, collections of value from Mr. Oldham, whose instructive lecture on the progress of his labours hitherto in the field of Indian Geology rendered our September Meeting one of great interest. The Society will be glad to learn that its collection of tertiary fossils from different parts of India is in course of being arranged by Dr. Falconer.

Officers.

The Council have again to express their satisfaction with the manner in which the Curators and the Librarian have discharged their respective duties.

Journals.

Six numbers of the Journal have been published during the year and a seventh is nearly ready for publication. An Index to the

whole series of the Journal and to volumes XIX. and XX. of the Asiatic Researches has also been prepared, and will be published in the course of the coming year. The facilities offered to the circulation of books and pamphlets in India by the new Postal Act will, the Council trust, materially promote the sale of this and their other publications.

Oriental Fund.

The Council have much pleasure in announcing that the impulse given to the publications of the *Bibliotheca Indica* by the arrangements adopted in 1853 has enabled them to issue 38 Nos. within the past year. Portions of fifteen different works have appeared, of which 5 Nos. have been edited by Dr. Röer, 6 Nos. by Lt. Lees, 1 by Dr. Sprenger, 19 by Maulvi Mohammad Wajeeh, Maulvi Bashír-uddín, Maulvi Sadídudín and Maulvi Abdul Haq, and Múnshí Golam Qadir, 3 by Professor Hall, and 3 by Bábu Rájendralál Mittra.

The following are the names of the works published.

1. The Aphorisms of the *Vedánta*, by Bádaráyna with the commentary of Sankara A'cháryya and the Gloss of Govindánanda—Edited by Dr. E. Röer, Fas. II. No. 89.
2. *Uttara Naishada Charita*, by Sri Harsa, with the commentary of Náráyana—Edited by Dr. E. Röer, Fas. VIII., IX. and X. Nos. 72, 87 and 90.
3. The *Sanhítá* of the Black *Yajur Veda* with the commentary of Mádhava A'chárya—Edited by Dr. E. Röer, Fas. I. No. 92.
4. The *Fatooth ul Sham*, being an account of the Mooslim conquests in Syria, by Aboo Ismael bin abd allah el azdi ul Baçri—Edited by Lt. Lees, Fas. III. and IV., Nos. 84 and 85.
5. The conquest of Syria commonly ascribed to Aboo abd allah Mohammed bin Omar ul Wakidi—Edited by Lt. Lees, Fas. III. @ VI., Nos. 96, 98, 102 and 103.
6. The Logic of the Arabians, in the Original Arabic, with an English Translation, by Dr. A. Sprenger, No. 76.
7. Soyniy's *Itqan* on the exegetic sciences of the *Qorân*—Edited by Maulvis Sadídudín and Bashiruddin, Fas. IV. to X., Nos. 68, 70, 74, 77, 81, 99 and 104.

8. A Biographical Dictionary of Persons who knew Mahommed, by Ibn Hazár—Edited in Arabic by Maulvis Mohammed Wajeeh, Abdul Haqq and Golám Qadir, Fas. II. to VII. Nos. 69, 75, 83, 86, 93 and 101.

9. A Dictionary of the Technical Terms used in the Sciences of the Musalmans—Edited by Maulvis Mohammed Wajeeh, Abdul Haqq and Golám Qadir, Fas III. to VI. Nos. 82, 88, 95 and 100.

10. Tüsý's list of Shyáh Books and Alam ul Hodas Notes on Shyáh Biography—Edited by Maulavi Abdul Haqq, Fas. II. and III. Nos. 71 and 91.

11. The Sánkhyá Pravachana Bháshya or Aphorisms of the Sankhya Philosophy, with a commentary—Edited by F. E. Hall, Esq. A. M. Fas. I. and II., Nos. 94 and 97.

12. The Surya Siddhanta with its commentary, the Guḍhártha Prákásáka—Edited by Fitz. Edward Hall, A. M. Fas I. No. 79.

13. The Lalita Vistara, or the Memoir of the Life and Doctrines of Sákya Siñha—Edited by Bábu Rájendralál Mittra, Fas. II. No. 73.

14. The Chhándogya Upanishad of the Sáma Veda, translated from the Original Sanskrita, by Bábu Rájendralál Mittra, Fas. I. No. 78.

15. The Chaitanya Chandrodaya or the Incarnation of Chaitanya—Edited by Bábu Rájendralál Mittra, Fas. III. No. 80.

One of the works published by Lieut. Lees, (Abú Isma'el's conquest of Syria) and another (Waquidy's Mogházi or Military Campaigns of the Prophet) which is now being edited by M. Von Kremer of the Austrian Consulate at Alexandria, form the texts of two writers of the first period of Arabic literature, hitherto inaccessible to Orientalists. For the opportunity of seeing the last work in our series, we are indebted to the exertions of our absent and enthusiastic member, Dr. Sprenger, at whose suggestion also our Philological Committee is in communication with Dr. Dozy of Leyden, regarding the publication of another writer of the same period, Belázori.

The President moved the following resolution of which notice was given at the December Meeting: "Candidates for admission as ordinary members may be proposed by any ordinary member who has received authority from the candidate to propose him, and the pro-

posal after being seconded by another ordinary member shall be laid before the next meeting of the Council ; the names of the candidate and his proposer and seconder, shall be read at the two ordinary general meetings next ensuing such meeting of the Council, and during the interval between these two meetings shall be suspended in the society's meeting room, and the person proposed shall be balloted for at the last of such ordinary general meetings ; and to constitute a valid election, not less than seven members must be present, and not less than two-thirds of those present must vote in favour of the candidate proposed."

Dr. Falconer proposed the following amendment, being the text of the draft bye-law, proposed by the Committee which was entrusted with the drawing up of the code of 1851. The amendment was seconded by Dr. Walker.

" Candidates for admission as ordinary members shall be proposed by a certificate in writing, signed by two or more ordinary members. The certificate shall specify the name, rank, profession, or trade of the candidate, that he is attached to science (or literature) and anxious to promote its progress, and that he is desirous of becoming a member. The certificate must be addressed to the Secretary, who shall lay it before the next meeting of the Council. It shall be read at the two ordinary general meetings next ensuing such meeting of the Council, and during the interval between these two meetings, it shall be suspended in the society's meeting room. The person therein proposed shall be balloted for at the ordinary general meeting at which the certificate is appointed to be read the second time, and immediately after such reading, and to constitute a valid election not less than eleven members must be present, and not less than two-thirds of those present must vote in favour of the candidate proposed."

Mr. Houstoun moved another amendment as follows : " that the Society revert to the original rule regarding the election of members which was in force before the adoption of the new code."

Captain Sherwill seconded this amendment.

The President then put Dr. Falconer's amendment which, as was also Mr. Houstoun's, was negatived. The original Resolution was then put and carried.

The meeting then proceeded to the election of Office-bearers for the ensuing year.

Mr. Mills and Capt. Sherwill having been appointed scrutineers, the following gentlemen were declared elected to serve for the ensuing year.

President.

Sir James W. Colvile, Kt.

Vice-Presidents.

Major General Hon'ble J. Low.

Lieut.-Col. W. E. Baker.

Bábu Rámgópál Ghose.

Council.

C. Allen, Esq.

Dr. G. G. Spilsbury.

Dr. A. C. Macrae.

Dr. T. Boycott.

Capt. H. L. Thuillier.

Lt. W. N. Lees.

Dr. E. Röer.

H. Woodrow, Esq.

H. Walker, Esq.

Bábu Bámaprásád Roy.

A. Grote, Esq.

STATEMENT
Abstract Statement of Receipts and

ZOOLOGICAL MUSEUM.

Government grant for a Curator, ..	..	3,000	0	0
Do. for Establishment and Contingencies, ..	..	600	0	0
		<hr/>		
			3,600	0 0

MUSEUM OF ECONOMIC GEOLOGY.

Government grant for a Curator, ..	..	3,000	0	0
Do. for Establishment and Contingencies, ..	..	768	0	0
		<hr/>		
			3,768	0 0

CONTRIBUTION, .. ..	..	7,082	0	0
		<hr/>		
			7,082	0 0

ADMISSION FEE, .. ..	..	480	0	0
		<hr/>		
			480	0 0

LIBRARY.

Proceeds of Books sold, .. ..	..	1,292	0	0
		<hr/>		
			1,292	0 0

JOURNAL.

Subscription and sale proceeds, .. ..	..	1,079	12	0
		<hr/>		
			1,079	12 0

SALE OF ORIENTAL PUBLICATIONS.

Proceeds of Books sold, .. ..	..	306	0	0
Freight, Contingencies, &c. refunded by the Oriental Publication Fund, .. ..	..	8	7	6
		<hr/>		
			314	7 6

DEPOSIT.

W. Theobald Esq. .. ..	..	20	8	0
		<hr/>		
			20	8 0

SECRETARY'S OFFICE.

Saving of Salary, .. ..	..	24	4	1
General Establishment, Fine, .. ..	..	1	0	0
		<hr/>		
			25	4 1
Carried over,..				
			17,661	15 7

No. 1.

Disbursements for 1854.

ZOOLOGICAL MUSEUM.

Curator's Salary and House-rent, ..	..	3,480	0	0
Establishment, ..	..	540	0	0
Contingencies, ..	..	163	10	6
Taxidermist, ..	..	108	0	0
				4,291 10 6

MUSEUM OF ECONOMIC GEOLOGY.

Curator's Salary, ..	..	3,000	0	0
Establishment, ..	..	420	0	0
Contingencies, ..	..	256	15	9
				3,676 15 9

LIBRARY.

Librarian's Salary, ..	..	840	0	0
Establishment, ..	..	96	0	0
Book-binding, ..	..	241	6	0
Contingencies, ..	..	265	6	0
Purchase of Books, &c.	..	150	0	0
Book Cases,	..	64	8	0
Stationery,	..	18	9	0
Extra Writer, ..	..	37	3	0
				1,713 0 0

JOURNAL.

Copying Index, ..	..	36	0	0
Printing, ..	..	1,806	14	0
Drawing, colouring and Lithographing, ..	..	973	10	0
Contingencies, ..	..	38	0	0
Postage, ..	..	6	14	6
Freight, ..	..	123	14	0
				2,985 4 6

SALE OF ORIENTAL PUBLICATIONS.

Freight, ..	..	5	7	0
Contingencies, ..	..	0	0	6
Cost of a Diagram, ..	..	3	0	0
Paid to the Oriental Publication Fund, ..	..	306	0	0
				314 7 6

DEPOSIT.

Messrs. Houstoun, Walker, Sprenger and Hall,	77	7	9	
				77 7 9

SECRETARY'S OFFICE.

General Establishment, ..	..	1,038	0	0
Secretary's Establishment, ..	..	648	0	0
Contingencies, ..	..	35	8	0
Postage, ..	..	141	5	6
Stationery, ..	..	42	12	0
New Cabinets, ..	..	90	0	0
				1,995 9 6

Carried over,.. 15,054 7 6

Brought forward, Co.'s Rs. 17,661 15 7

VESTED FUND.	..	14 6 1	14 6 1
Interest of Company's Paper,	..	<hr/>	<hr/>

BALANCE.

In the Bank of Bengal, at the close of 1853, ..	3,502 11 0		
Cash in hand,	359 15 5	<hr/>	<hr/>
Inefficient Balance,	376 8 1	<hr/>	376 8 1

Company's Rupees,.. 21,915 8 2

1st January, 1855.

Brought forward, Co.'s Rs. 15,054 7 6

VESTED FUND.

Commission on sale and purchase, &c. &c. ..	9 11 9	9 11 9
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MISCELLANEOUS.

Contingencies for Meeting, &c. ..	265 11 0	265 11 0
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DR. FAYRER,

Postage,	1 2 0	1 2 0
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BUILDING.

Tax,	328 2 0
Repairs, &c.	574 7 6
	902 9 6

BALANCE.

In the Bank of Bengal, ..	5,184 8 4
Cash in hand, ..	28 13 10
	5,213 6 2
Inefficient Balance,	468 8 3
	468 8 3
	5,681 14 5
Company's Rupees, ..	21,915 8 2

E. E.

A. GROTE,
Secretary.

STATEMENT
Dr. Cash Receipts and Disbursements of the Oriental Publication

CUSTODY OF ORIENTAL WORKS.

Fine,	..	..	..	..	<u>0 4 0</u>	0 4 0
ASIATIC SOCIETY.						
Interest of Company's Paper,	..	..	..	<u>26 1 10</u>	26 1 10	
ISSEN CHUNDER MAZUMDAR,						
Loan,	..	..	..	..	<u>1 2 5</u>	1 2 5
UTTRA NAISHADA,						
Refund,	..	..	..	..	<u>315 13 0</u>	315 13 0
GOVERNMENT ALLOWANCE,						
	..	..	..	<u>6,000 0 0</u>	6,000 0 0	

VESTED FUND.

Interest of Company's paper, &c.	..	..	<u>2,068 4 4</u>	2,068 4 4
BIBLIOTHECA INDICA,				
Sale of Oriental Publications,	..	..	<u>482 10 0</u>	482 10 0
DEPOSIT ACCOUNT, ..	..	..	<u>11 0 0</u>	11 0 0

Carried over,.. 8,905 3 7

No. 2.

Fund for 1854.

Or.

CUSTODY OF ORIENTAL WORKS.

Librarian's Salary,	..	..	..	360	0	0
Establishment,	..	..	..	144	0	0
Book binding,	..	..	..	117	4	0
Glass Case, &c.	..	..	..	269	0	0
Contingencies,	..	..	..	34	0	0
Stationery,	..	..	..	8	13	0
Postage, ..	..	..	..	11	5	0
				944	6	0

ASIATIC SOCIETY.

Loan of last year,	..	..	..	6	7	11
Brokerage, Commission, &c. paid to Government Agent on its account,	..	..	..	14	6	1
Cash, ..	..	..	..	11	11	9
				32	9	9

DICTIONARY OF TECHNICAL TERMS.

Printing, ..	..	..	..	1,916	9	0
Copying, ..	..	..	..	139	5	6
Editing Charges, ..	..	..	..	570	11	6
Postage, ..	..	..	..	17	1	0
				2,643	11	0

ISHA &c. UPANISHAD.

Editing Charges,	92	4	0
					92	4

BIOGRAPHICAL DICTIONARY.

Copying Charges,	34	5	6
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Editing Charges,	216	7	3
				1,304	12	9

FATOOTH UL SHA'M.

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				324	0	0

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Printing Charges,	479	0	0
					479	0

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Editing Charges,	90	0	0
Printing Charges,	14	0	0
				104	0	0

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				294	8	0

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Carried over,. . . 8,905 3 7

			Brought forward, Co.'s Rs.	6,219	3	6
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Editing Charges,	36	0	0
ISSEN CHUNDER MAZUMDUR, ACCOUNTANT,...						
			1	2	5	
SARVADARSAN SANGRAHA.						
Printing Charges,	224	0	0
APHORISMS OF THE VEDA'NTA.						
Printing Charges,	224	0	0
UTTARA NAISHADA.						
Printing Charges,	448	0	0
BLACK YAJUR SANHITA'.						
Dr. Röer on account Editing Charges,	..		146	14	0	
BLACK YAJUR BRAHMANA.						
Bábu Rajendralal Mittra, on acct. Editing Charges,	50	0	0
GOVERNMENT SECURITY.						
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Discount,	11	4	9
Commission and Brokerage,	85	6	2
COPYING OF PURA'NS,						
	67	9	10
ITQAN.						
Printing Charges,	1,134	0	0
SA'NKHYA PRAVACHANA BHA'SHYA.						
Printing Charges,	782	3	0
Freight,	7	0	0
WAQIDY.						
Postage,	39	8	0
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Brought forward, Co.'s Rs. 8,905 3 7

BALANCE OF 1853.

In Company's Paper with the Government Agent,	7,000	0	0
Cash in his hands,	..	..	1,077 15 10
In the Bank of Bengal,	..	..	<u>817 0 3</u> 817 0 3

Company's Rupees,.. 17,800 3 8

1st January, 1855.

RA'GHAVA PA'NDAVIYA.

					12,213	13	1
Cost of 5 copies of the above,	25	0	0	25	0

ARABIC LOGIC.

Editing Charges,	15	0	0	15	0
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BALANCE.

In Company's Paper with the Government Agent,	3,500	0	0				
Cash in his hand,	10	4	0	3,510	4
In the Bank of Bengal,..	..	..	1,985	11	8		
Cash in hand,	45	6	11	2,031	2
Inefficient Balance,	5	0	0	5	0
Company's Rupees,..			17,800	3	8		

E. E.

A. GROTE,

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Balnk of Bengal,	Rs. 5,184 8 4	J. W. Laidlay, Esq.	418 7 4
in hand,	28 13 10	R. Houston, Esq.	176 0 0
efficient Balance,	468 8 0	W. Theobald, Esq.	10 8 0
Balnk of Bengal on account of Journal,	108 12 5	Journal Nos. IV. to VII, say,	800 0 0
Government Agent,	500 0 0		
Williams and Norgate	838 8 0		
			<hr/>
			1,696 7 4
			<hr/>
		Company's Rupees,	1,696 7 4
			<hr/>

OUTSTANDING.	
contribution,	Rs. 7,104 12 11
admission Fee,	320 0 0
subscription to the Journal,	959 4 0
ale of Journal,	70 12 0
library,	330 4 0
Calcuttaian Society of Arts,	83 1 9
Dr. Fayer,	1 2 0
	<hr/>
	8,869 4 8
	<hr/>
	Company's Rupees,
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	15,998 7 3
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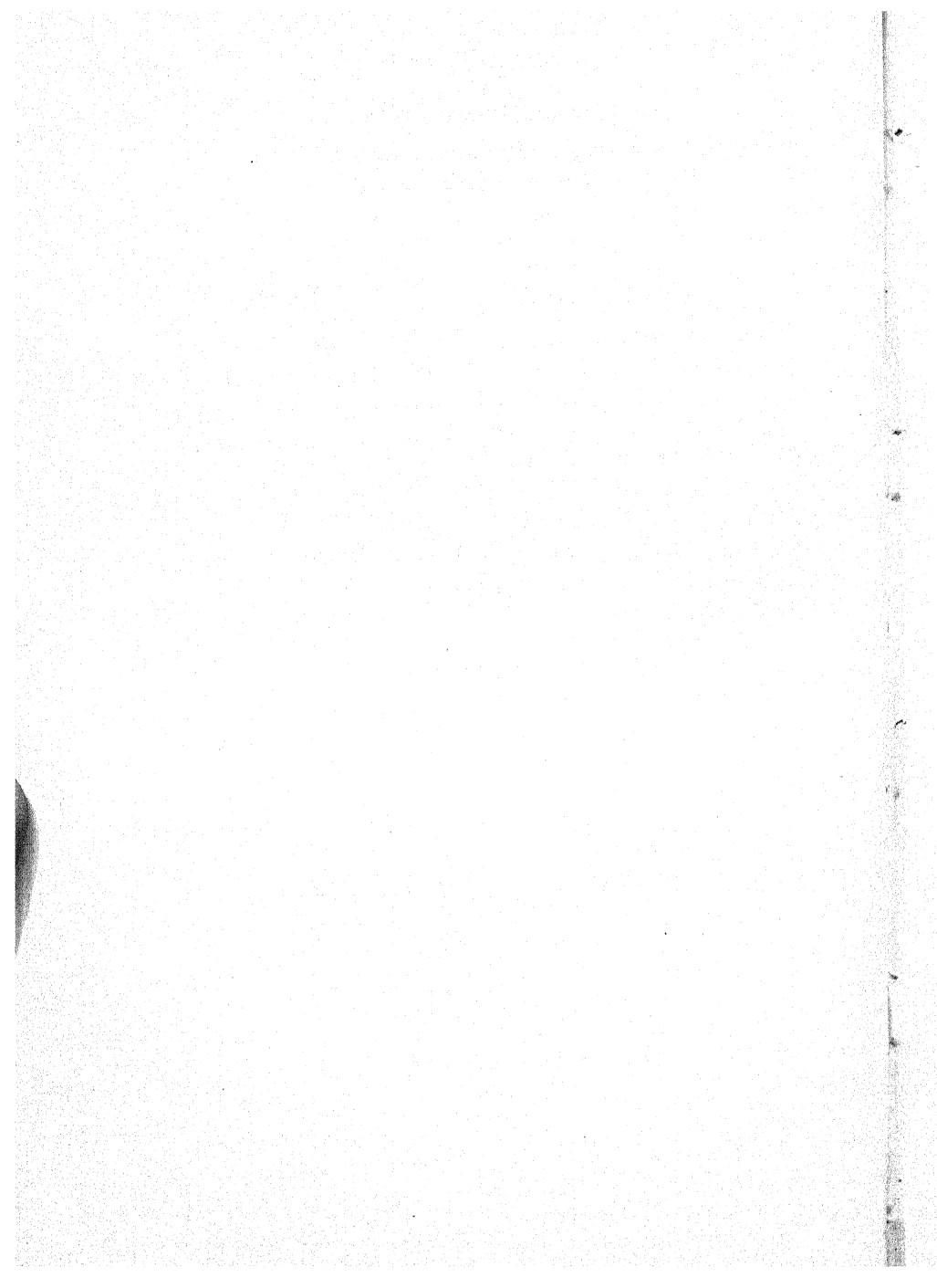
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JOURNAL
OF THE
ASIATIC SOCIETY.

No. II.—1855.

*A Tale by INSHÁ ALLÁH KHÁN, Translated by the Rev. S. SLATER,
Senior Professor of Bishop's College.*

(Concluded from vol. XXI. p. 23.)

پھر سبنتے اب رانی کیتکی کے باپ اور اور مہاراجہ جگت پر کاس
کی سہنی آنکے گھر کا گھر گردی کے پانو پر گرا اور سب نے
سر جھکا کر کہا مہاراج یہہ اپ نے بڑا کام کیا ہم سب کو رکھہ لیا
جو اج آپ آنہ پہنچتے تو کہا رہا تھا سب نے مر منٹے کی تھان لی
تھی ان پابیوں سے کچھہ نچیلیگی یہہ جان لی تھی راج پات
سب ہمارا فچھا اور کوئے جسکو چاہئے دے ڈالئے ہم سب کو اندیت
بغنا کے اپنے ساتھہ لیجئے راج ہمسے نہیں تھمنتا سورج بھان کے
ہاتھ سے آپ نے بچایا اب کوئی آنکا چچا چندر بھان چوڑہ آؤیکا

Listen again : listen to the story of Ráni Ketakí's father, the Rájá Jagat Prokás. The whole of his family fell at the feet of the spiritual guide, and, bowing their heads, spoke thus : " Great Sir, you have done a great favour in rescuing us all. If you had not arrived this day, what fate would have awaited us ! For we were all on the point of perishing outright. These wretches can now do us no harm. Devote and deliver our empire to whomever you will ; and

تو کہونکر بیچنا ہوگا انذی آپ میں تو سکت نہیں پھر ایسی راج
 کا پہنچے منہہ کہاں تلک آپکو سنایا کریں یہہ سنکھ جو گی مہندر گر لے
 کہا تم سب ہمارے بیٹا بیٹی ہو انذدیں کرو بنداو سکھہ چین سے
 ایسا وہ کون ہی جو تمہیں آنکھہ پھر اور قہب سے دیکھہ سکے
 یہہ بگھمبر اور بھبوٹ ہمہی تمہیں دیا جو کچھہ ایسی گاز پڑے
 تو اس بگھمبر میں سے ایک رونکتا توڑ کر آگ پر دھر کے پھونک
 دیجو وہ رونکتا پھونکنے نپاریگا جو ہم آن پہنچیں گے رہا بھبوٹ سو
 اس لئے ہی جو کوئی چاہے اسے انجن کرے وہ سب کچھہ دیکھہ لے
 اور آسے کوئی ندیکیجے جو چاہے کولے گزو مہندر گر چنکے پانو
 پوچھئے اور دھن مہاراج کہئے آنسے تو کچھہ چھپاؤ ملنا مہاراجہ
 جگت پرکاس اُنکو مورچہل کرتے ہوئے رانیوں کے پاس لیگئے
 سونے روپے کے پھول گود بھر بھر سب نے فیجاور لئے اور مانیے رکتے

receive us as your devoted servants and take us with you. We cannot support the kingdom by ourselves. You have saved us from the hand of Súrajbhán. If once his uncle Chandarbán shall make an assault on us, how will escape be possible? It cannot be through my power. A curse, too, on such a kingdom! Why should I trouble you so much?" On hearing this, the Jogi Mahandar Gur replied: "You are my sons and daughters; be comforted, be tranquil and at your ease. Who now is such that he dare scowl upon you with enmity? I have given you this tiger-skin and these ashes. If any such difficulty befal you, pluck a hair from the skin, and light it in the fire. The hair will not have been consumed before I shall hasten to you. As for the ashes, they are for this purpose, that whoever desires, may, by using them as a collyrium, see everything without being seen himself, and he can do whatever he pleases."

The Guru's going to the Rájá's habitation.

Revere the feet of guru Mahandar Gur, and give praise to the Mahárájá, for from him nothing is hidden.

آنہوں نے سب کی پیدائشیں تھوڑی کی رانی کیتکی نے بھی ڈنڈوت کی
پر جی ہی جی میں بہت سی گروچی کو گالیاں دیں گروچی
سات دن سات راتیں راجہ جگت پرکاس کو سنگاسن میں بیٹھا کے
اپنی اُس بگھمبر پر اُس دل سے کیلاس پہاڑ پر آدمکی راجہ
جگت پرکاس اپنی اگلی ڈھب سے راج کرنے لگا *

رانی کیتکی کا مدن بان کے آگے رونا پچھلی باتوں کا دھیان
کر کے ہاتھہ جیسے دھونا اپنی بولیکے دھوؤں میں

رانی کو بہت بیکلی تھی
کب سوچتی وہ بڑی بھلی تھی
چپکے چپکے کراہتی تھی
جینا اپنا نچاہتی تھی
کہتی تھی کبھی ارسے مدن بان
ہی آئہ پھر مجھے وہی دھیان

Rájá Jagat Prokás, waving over the Guru a fan of peacock's feathers, conducted him to his queens, who filled their laps with flowers of gold and silver and offered them to him, and prostrated themselves before him. He patted them on the back, Rání Ketakí also prostrated herself before him, but in her heart bitterly reviled him. The Guru, after remaining there seven days and nights, and enthroning the Rájá Jagat Prokás, having mounted his tiger-skin in the same manner as he came, hastened back to Mount Koilas, and the Rájá began to rule as before.

Rání Ketakí, as described in couplets of her native tongue, laments before Madan-bán, and, at the thought of what has passed, gives up all hope of life.

Great was the agitation of the Rání and she took no note of evil or of good. Mutely she sighed, and wished not for life. But

بیہاں پیاس کے بھلا کسے بوکھہ
 دیکھوں ہوں وہی ہری ہری روکھہ
 ٹبکی کا ڈرہی اب یہہ کبھی
 چاہت کا گھر ہی اب یہہ کبھی
 آمریوں میں آنکا وہ آنڑنا
 اور رات کا سائیں سائیں کرنا
 اور چپکے سے آئہ کرمیرا جانا
 اور تیری وہ چاہکا جتنا
 آنکی وہ آثار انگوٹھی لیندی
 اور اپنی انگوٹھی آنکو دیندی
 آنکھوں میں میری وہ پھر رہی ہی
 جی کا جو روپ تھا وہی ہی
 کپونکر آنھیں بھولوں کبا کروں میں
 مان باپ سے کب تلک ڈرلوں میں
 اب میں نے سنا ہی ای مدن بان
 بن بن کے ہرن ہوئے اور دی بہان

ever and again she exclaimed, 'O Madan-bán, alas! day and night am I absorbed in these thoughts. Thirst I feel not, nay, nor hunger; still do I see those green green trees. Tell that the dread of an unexpected calamity has befallen me; tell that love has here taken up its abode. Among the mangoe-trees did he alight, and the night wind was soughing; stealthily did I arise and approach him, and thou didst apprise him of my passion. I took off his ring, and I gave him my own. Again does all this present itself to my eyes, and still is my heart as then it was. How shall I forget him, and what shall I do? And how long am I to fear my mother

چرتے ہونگے ہری ہری درب
 کچھ تو بھی پسیح سوچ میں درب
 میں اپنی گئی ہوں چوتھی بھول
 مت مجھکو سونگھا، یہہ ڈھڈھی پھول
 پھولونکو آٹھا کے بھاں سے لنجا
 سو نکرے ہوا میرا کلنجا
 بکھرے جی کو نکر انھا
 ایک گھاس کا لائے رکھہ دے گئھا
 ہریالی اُسی کی دیکھہ لونمیں
 کچھ اور تو تجھکو کبا کھونمیں
 ان انکھوں میں ہی بیڑک ہرنکی
 پلکیں ہوئی جیسی گھاس بن کی
 جب دیکھئے ڈھدھا رہیں ہیں
 اوسیں آنسوک چھا رہیں ہیں
 یہہ بات جو جی میں گرگئی ہی
 ایک اُس سی مجھ پر بڑھی ہی

and my father? Just now, O Madan-bán, I have heard that Uday-bhán has been turned into a deer. Now will he be eating the green green grass. Thou, too, sunk in grief, dost pity me. I have been fascinated; so give me not those fresh flowers to smell. Take them away; for my liver is rent into a hundred pieces. Collect not my life now dispersed, but bring me a bundle of grass. I would see its verdure. And what else now can I say to thee? My eyes start like a deer's, and the lashes of my eyes are dishevelled like the grass of the forest. When any look at me, they moisten, and are suffused with the dew of tears. Since my state has become as now, I have lost all my lustre.'

اسیدول سے جب اکیلی ہوتی تھی
تب مدن بان کے ساتھ ایسی ہی موٹی پورتی تھی

بھبوٹ مانگنا رانی کیتکی کا اپنی مان رانی کام لتا سے آنکھہ
مچوں کھیلنے کے لئے اور روٹھہ رہنا اور راجہ جگت پر کاس
کا بلانا اور پیار سے کچھہ کچھہ کہنا اور وہ بھبوٹ دینا
ایک رات رانی کیتکی نے اپنی مان رانی کام لتا سے
بھلاڑے میں ڈال کے یہ پوچھا گروچی گسانیں مہندر گرنے جو
بھبوٹ باپ کو دیا تھا وہ کہاں رکھا ہوا ہی اور اس سے کہا ہوتا ہی
آنکی مان نے کہا واری تو کبھوں پوچھتی ہی رانی کیتکی کھنیلی
آنکھہ مچوں کھیلنے کے لئے چاہتی ہوں جب اپنی سہیلیوں کے
ساتھ کھیلوں اور چوربندوں تو کوئی مجھکو پکڑ نہ سکے رانی کام لئے
کہا وہ کھیلنے کے لئے فہیں ہی ایسے لئے کسی برسے دن کے سماں کے

In this style, when Rání Ketakí was alone, did she string the pearls of verse before Madan-bán.

Rání Ketakí begs some ashes from her mother, Rání Kámlatá, in order that she may play at blindman's-buff; and is displeased at being refused. Rájá Jagat Prokás sends for her, and talks affectionately with her, and gives her some of the ashes.

One night Rání Ketakí, wheedling her mother, Rání Kámlatá, spoke and requested as follows : "Where have you placed the ashes which the Guru Gosain Mahandar Gur gave to my father? And what are they for?" Her mother replied : "Tell me, I beseech you, why you ask this." Rání Ketakí rejoined : "I want it to play at blindman's buff with. When I play with my attendants, and I am thief, then no one will be able to catch me." The Rání replied : "This is not a thing to play with. Such charms as these are kept for aid in an evil day. Who can know at what time evil will come."

ذال رکھتے ہیں کہا جانے کوئی گھری کیسی ہی کیسی نہیں رانی کیدکی اپنی ماں کے اس بات سے اپنا منہ تھہا کے روٹھہ گئی اور دن بھر کھانا نہ کھایا مہاراج نے جو بالایا تو کہا مجھے رچ نہیں تب رانی کام لتا بول آئیں اجی کچھہ تمعنے سنا بیٹی تمہاری آنکھہ مچوں کھیلنے کے لئے وہ بھبوتوں گروجی کا دیا ہوا مانگتی تھی میں نے ندیا اور کہا لوکی یہہ لوکپن کی باتیں اچھی نہیں کسی بُرے دن کے لئے گروجی دے گئے ہیں اسپر مجھسے روٹھی تھی بھتیرا بھلاتی پھسلاتی ہوں مانگتی نہیں مہاراج نے کہا بھبوتوں کہا مجھے اپنا جی بھی اسے پیارا نہیں اسکی ایک گھری بھر کے بھل جانے پر ایک جی تو کہا جو لاکھہ جی ہوں تو دے ذالئے رانی کیدکی کو ڈبیا میں سے تھوڑا بھبوتوں دیا کئی دن تلک آنکھہ مچوں اپنے ماں باپ کے سامنے سہیلیوں کے ساتھہ کھیلتی سب کو ہنساتی رہتی جو سوسو تھاں متینوں کے نچہاور ہوا کئے کہا

Rání Ketakí, greatly vexed at her mother on this account, arose and departed, and ate nothing the whole day. When the Rájá sent for her, she said that she had no appetite. "And have you heard what is the matter?" cried Rání Kámlatá, "Your daughter has been asking for the ashes which the Guru gave us, to play at blindman's buff with. I refused to give it, and told her that it was not a thing to be played with, but that the Guru had given it against evil days. At this she became displeased with me. I amused and coaxed her, but she would not heed." "What are ashes?" said the Rájá. "She is dearer than my very life. What is one life, if she may be amused for an hour? If I had a myriad of lives, they should be devoted to her." So he gave Rání Ketakí a little of the ashes out of the box. Several days she continued playing at blindman's-buff with her attendants, in presence of her mother and father, and diverted them all. Of the hundreds of trays of pearls which she bestowed,

کہوں ایک چُھل تھی جو کہئے تو کڑزوں پوتھیوں میں جیوں کے
تھیوں نہ آسکے *

رانی کیتکی کے چاہت سے بیکل ہوا پھرنا اور مدن بان کا
ساتھ سے نہیں کرنا

ایک رات رانی کیتکی اُسی دھیان میں اپنے مدن بان سے
کہہ اُنھی اب میں نگوڑی لاج سے کٹ گرتی ہوں تو میرا ساتھ
دے مدن بان نے کہا کبونکر رانی کیتکی نے وہ بہبوتوں کا لیندا اُسے
چتا یا اور یہہ سنایا سب یہہ آنکھہ مچول چھلیں میں نے اس
دن کے لئے کر رکھیں تھیں مدن بان کہنے لگی میرا لکھجا تھر تھوانے
لگا اسی یہہ مانا تم اپنی آنکھوں میں اس بہبوتوں کا انجن کرلو گی
اور میرے بھی لگادو گی توہمیں تمہیں کوئی ندیکپھیکا اور ہم تم
سب کو دیکھینے کے پر ایسے ہم کھاں سے جی چلے ہیں جو بن لئے
جو بن پیرے بھنکا کریں اور ہرنوں کے سینکوں میں دوتوں ہاتھہ

what shall I say, but that they were a trifle to her? Yet I could not speak accurately of them in myriads of volumes.

Rání Ketakí is disquieted for love, and Madan-bán refuses to attend her.

One night, Rání Ketakí, while reflecting in those matters, thus addressed Madan-bán, "Now will I, unfortunate, bid adieu to modesty. Do thou second me." "How can this be?" said Madan-bán. Rání Ketakí informed her that she had procured the ashes, and added "In anticipation of this day did I make a pretext of playing blindman's-buff." "My heart is all of a flutter," said Madan-bán. "It may be that you may make a collyrium for your eyes of these ashes, and that you may apply it to mine also; and that no one shall see us, and that we shall see everything. But how can

ذال کے لئکا کریں اور جسکے لئے یہ سب کچھ ہی سو وہ کہاں اور
ہووے تو کہا جانے جو یہہ رانی کیتکی جی اور یہہ مدن بان نگوڑی
نوچی کھسوٹی آنکی سہیلی چولجے اور بھاڑ میں جائے یہہ چاہت
جسکے لئے ماں باپ راج پات سکھہ نیند لاج کو چھوڑ کر ندی کے
کچھاڑوں میں پھرنا پڑے سو بھی بیدول جو وہ اپنی روپ میں
ہوتے تو بھلا تھوڑا بہت کچھہ اسرا تھا نہ جی یہہ ہم سے نہو سکیگا
مہاراج جگت پرکاس اور مہارانی کام لتا کا ہم جان بوجھہ کر گھر
آجازیں اور بھکا کے آنکی بیٹی جو اکلوتی لاذکی ہی اُسکو
لیجھاریں اور جہاں تھاں اُسے بھتنا اور بنداس پتی کھلاویں اور اپنے
چوندے کو ہلاویں ای جی اُس دن تمہیں یہہ بوجھہ نہ آئی
تھی جب تمہارے اور اسکے ماں باپ میں اُرائی ہو رہی تھی
اُس نے اُس مالن کے ہاتھہ تمہیں لکھہ بیججا تھا بھاگ چلیں
تب تو اپنی منہ کے پیک سے اُسکی چتھی کے پیٹھے پر جو لکھا تھا

we be so infatuated as forgetting our beauty to wander in the woods
and swing with our hands on the horns of deer? And where is he
for whom all this is to be done? And if he were to be found, how
will he know that this is Rání Ketakí, and that this is Madan-bán,
her wretched, scratched, torn, and wounded companion? A curse
on this love, for abandoning the kingdom of your parents, and
pleasure, and sleep, and shame, we are called to wander on the banks
of streams! It would be unseemly too. If he were in his own
form, there would be some little hope of finding him. But as it is,
I cannot undertake knowingly to render desolate the house of the
Rájá Jagat Prokás and the Rání Kámlatá, and to deceive and lead
away their only darling daughter; and to cause her to wander here
and there, and to make her subsist upon the leaves of the forest;
and to reduce her to misery. This mad course did not occur to you
on that day when war was raging between your parents and his.

سو کپا بھول گیا تب تو وہ تاؤ بھاؤ کھایا تھا اب جو وہ کنور اودی بھان
اور آنکے مان باپ جنے بن بن ہرن ہر نی ہوئے کپا جانے کہ
ہر نیوں کے آنکی دھیان پر آتی کربیٹھی جو کسی نے تمہارے
گھرانے بھر میں نہیں کی اس بات پر مائی ڈال دو نہیں تو پچتاوگی
اور اپنا کیا پاؤ گی مجھ سے تو کچھ نہ ہو سکیا تمہاری کچھ اچھی
بات ہوتی ہو تو جیتنے جی میرے منہ سے نہ نکلتی بڑی یہ
بات میرے پیٹ میں نہیں پیج سکتی تم ابھی الہر ہو تمنے کچھ
دیکھا نہیں جو اسی بات پر تمہیں سچ میج ڈھلتا دیکھوں گی تو
تمہارے مان باپ سے کھرو وہ بہبودت جو موا نگوڑا بہوت مچھندر کا
پوت آبد ہوت دیگیا ہی ہانہہ مزوڑا کے چہندا لو نگی رازی کینکی نے
یہہ رکھائیا مدن بان کی سنکر ٹال دیا اور کھا جسکا جی ہانہہ
میں نہ وہ ایسی ایسی لاکھوں سوچتی ہیں پر مجھے ادرا کرنے سے

By the hand of the gardener's wife he wrote to you to beg that you would flee away with him. Have you forgotten what answer you then returned? Now that the prince Uday-bhán and his parents have all three become deer of the forest, how is one to know where they are? Thus to persist in thinking of him, in a style unprecedented in your whole family, is unbecoming. Abandon this intention. Otherwise you will rue it, and will suffer the consequences of what you do. I can be of no assistance. Any good resolution of yours should never pass my lips while I lived; but this affair I cannot conceal. You are still inexperienced; you have seen nothing. If I shall perceive that you are really fixed in your determination, I shall inform your parents of it, and shall have those ashes, which that cursed wretched goblin, son of a dolt, the ascetic, gave, taken away from you." Rání Ketakí, on hearing this incivility of Madan-bán put her off with a laugh, saying, "Every one whose heart is not his own, has myriads of such vain thoughts as mine; but there is a wide difference between saying and doing. Well, it

بہت سا پھر ہی یہہ بہلا کوئی اندر ہیر ہی جو مان باپ کو
چھوڑ ہرنوں کے لئے پری دوڑتی پھر وہ پر اری تو بری باولی چڑیا
ہی جو تو یہہ بات تیہلک تھا کر جان لی اور مجھ سے لٹنے لگی *رانی کیتکی کا بھبوٹ آنکھوں میں لگا کر گھر سے نکل جانا
اور چھوٹے بڑوں کا تملانا

دس پندرہ دن پیچھے ایک رات رانی کیتکی بن کے مدن بان
کے وہ بھبوٹ آنکھوں میں لگا کر گھر سے باہر نکل گئی کچھہ کہنے میں
فہیں اتا جو مان باپ پر ہوئی یہہ بات تھہرادي گروجی نے کچھہ
سمجھہ کر رانی کیتکی کو اپنے پاس بالیا ہو گا مہاراجہ جگت
پرکاس اور مہارانی کام لتا راج پات سے کچھہ اس بروگ میں
چھوڑ چھاڑ ایک بھاڑ کی چوئی پر جابینگ اور کسی کو اپنے لوگوں
میں سے راج تھامنے کے لئے چھوڑ آئے تب مدن بان نے وہ سب
باتیں کھولیاں رانی کیتکی کے مان باپ نے یہہ کہا اری مدن بان جو

would be an impropriety in me to abandon these dominions and my
modesty, and wander about running and leaping after deer. And
you are a great simpleton to have thought me in earnest, and to have
begun a quarrel with me on this account."

*Ráni Ketakí applies the ashes to her eyes, and escapes from the house.
Great and small are all in consternation.*

Ten or fifteen days afterwards, one night Ráni Ketakí, without
conferring with Madan-bán, applied the ashes to her eyes and left
the house. The state of her parents beggars description. All
made up their minds that their spiritual guide must, for some cause,
have summoned Ráni Ketakí to him. The Rájá Jagat Prokás and
the Ráni Kámlatá, quitting, on account of this desertion, their
kingdom and all else, repaired to the summit of a mountain, having

تو بھی آسکے ساتھ ہوتی تو کچھہ ہمارا جی تھہرنا اب جو وہ نجیھے لیجائیں تو تو کچھہ ہچھر مچھر نہ کیجو اُنکے ساتھ ہو لیجو جتنا بہبودت ہی تو اپنے پاس رکھہ ہم اس راکھہ کو چولیجے میں ڈالینگے گروچی نے تو دونوں راجوں کا کھوج کھویا کذور اودی بھان اور آسکے مان باب پوئون سٹھور رہے اور جگت پرکاس اور کام لتا کو یوں تلپیت کیا بھہبودت نہوتا تو یہہ باتیں کاہیکو سامنھنے آتیں مدن بان بھی اُنکے ڈھوندھنے کو نکلی انجن لکائے ہوئے کیتنکی رانی کیتنکی کہتی ہوئی چلی جاتی تھی بہت دنوں پیشے کہیں رانی کیتنکی بھی ہر ذنوں کے ڈاروں میں اودی اودی بھان چنگھاڑتی ہوئی آنکلی جو ایک نے ایک کو تازیر یوں پکارا اپنی اپنی آنکھیں دھو ڈالوایک

left one of their subjects in charge of the government. After an interval of many days the Rání addressed the Rájá Jagat Prokás in these words: "Madan-bán will know whatever is to be known of Rání Ketaki's secret. Send for her and make enquiry." The king called and questioned her. Madan-bán revealed the whole affair. "Madan-bán," said Rání Ketaki's parents, "if you were only with her, we should have some consolation. If now she sends for you, do not refuse: go and join her. Keep by you all the ashes that are left. Why should we throw them into the fire-place. The Guru has utterly desolated both kingdoms. Prince Uday-bhán and his father and mother are, on the one hand, quite ruined; and, on the other, Jagat Prokás and Kámlatá are destroyed. Had it not been for the ashes, how could this have happened?" Madan-bán went forth in search of them. Having applied the collyrium, she wandered about crying 'Rání Ketakí, Rání Ketakí.' Many days subsequently Rání Ketakí happened to be exclaiming, among a flock of deer, 'Uday-bhán, Uday-bhán.' Each recognised the other, and cried out to her to wash her eyes. They met and sat down near a pool. Embracing each other they bemoaned, so that their sobs

دباری پر بینہہ کر دنوں کے مت بھیر ہوئی گلے ملکے ایسی روئیاں
جو پہاڑوں میں کوک سی پر گنی *

دونوں اپنی بولی کا

دوہا

چھا گنی تھندی سانس جہازوں میں
پر گنی کوک سی پہاڑوں میں
دونوں جنیا ایک نیلے پر اچھی سی چہنان تاز کے آبینہیں
اپنی باتیں دھرانے لگیں بات چیت رانی کیتکی کی مدن بان
رانی کیتکی نے اپنی بینی سب کھی اور مدن بان وہی اگلا
چھیکنا جھینکا کی اور آنکی مان باپ نے آنکے لئے جو جوگ سادھا
اور جو بروگ لیا تھا سب کھا جب مدن بان یہہ سب کچھہ کھہ
چکی تو پھر ہسنے لگی رانی کیتکی یہہ لگی پڑھنے *

resounded among the mountains. Their sighing filled the woods, and their sobbing was heard on the mountains. Finding a pleasant shade they sat down in it, and began to recount their adventures.

Rání Ketakí's conversation with Madan-bán.

Rání Ketakí related all that had befallen her, and Madan-bán reiterated her former complaints, and told her in full how her parents had on her account become devotees and had gone into seclusion. When she had told all she began to laugh. Rání Ketakí was angry at her laughing and replied, "I am not dissuaded by your laughing; let any one laugh that will. My motto is that I am caught, that I am caught. Now, indeed, have all sorts of misfortunes overtaken me. Why seek for the thorn in my foot; it has entered into my soul." Madan-bán wiped away Rání Ketakí's

دوہا

هم نہیں ہنسنے کے رکتی جسکا جی چاہے ہنسے
 ہی وہی اپنی کہارت آپہنسے جی آپہنسے
 اب تو اپنے پیشج سارا جھگڑا جہانتا لگ گیا
 پاؤں کا کبا ڈھونڈھتی ہی چی میں کانٹا لگ گیا
 مدن بان سے کچھ رانی کینکی کے آنسو پونچھنے سے چلی
 آنے یہہ بات تپھرائی جو تم کہیں تھہرو تو میں تمہارے آجرے
 ہوئے ماں باپ کو چپ چاپ یہیں لے آؤ اور انہوں سے یہہ بات
 تھہراوں گسائیں مہندر گرجسکی یہہ سب کرتوت ہیں وہ بھی انہیں
 دونوں آجرے ہوئے کی مٹھی میں ہی اب بھی جو میرا کہا
 تمہارے دھیان چڑھے تو گئے ہوئے دن پھر پھر سکتے ہیں پر تمہاری
 کچھ بھاویں نہیں ہم کبا پرے بکتے ہیں اسپر بیدزا اُنھاتی ہوں بہت
 دنوں میں رانی کینکی نے اس پر اچھا کہا اور مدن بان کو
 اپنے ماں باپ کے پاس بیٹجا اور چٹھی اپنے ہاتھ سے لکھہ بھیجی
 جو آپ سے کچھ ہوسکے تو اُس جوگ سے یہہ تھہرا کے آویں *

tears, and said, "If you will stop at any place, I will privately bring your disconsolate parents to you, and through them will bring this affair to a termination. The ascetic Mahandar Gur, whose doing all this is, is under their authority. If what I say meets your approval, the days that are past may come again; but you do not approve it. But why am I chattering? I will undertake for you." After the lapse of many days Rání Ketakí gave her consent, and sent Madan-bán to her parents, despatching by her hands this note which she wrote: "If you can do anything, arrange with the Jogí and come."

مہاراج اور مہارانی کے پاس مدن بان کا پھر انا اور
چت چاہے بات کا سنانا

مدن بان رانی کیتکی کو چھوڑ کر راجہ جگت پرکاس اور
رانی کام لتا جس پہاڑ پر بیٹھے ہوئے تھے وہاں جہت سے آدیس کر کے
اکپری ہوئی ہی اور کہتی ہی لیجئے آپکا گھر نئے سرے سے بسا
اور اچھے دن آئے رانی کیتکی کا ایک بال بھی بیندا نہوا آنہبیں کے
ہاتھہ کی بہہ چھی لائی ہوں آپ پڑھ لیجئے آگے سوچاہے سو
کیجھی مہاراج نے اسی بگھمبر میں سے ایک رونگٹا توڑ کر آگ پر
دھوڑ دیا بات کے بات میں گسائیں مہندر گر آپہنپے اور جو کچھہ نیا
سانگ جوگی اور جوگن کا آیا تھا آنکھوں دیکھا سب کو چھاتی سے
لگایا اور کہا بگھمبر اسی لئے میں سونپ گیا تھا جو تم پر ہووے
تو اسکا ایک رونگٹا پہونک دیجو تمہارے گھر کی بہہ گت ہو گئی
اب تک قم کبا کر رہے تھے اور کس نیندوں سو رہے تھے پر قم نبا کرو

Madan-bán returns to the Mahárájá and the Maháráni and tells them the pleasing news.

Madan-bán leaving Rání Ketakí alone presented herself in great haste before Rájá Jagat Prokás and Rání Kámlatá on the mountain where they had taken up their abode; and having made the proper salutation thus addressed them: "Come, enter on the duties of your kingdom, your home is again peopled, and happy days have come. Not a hair of Rání Ketakí's head is disordered; I have brought you a letter written by her own hand. Read it and do whatever you may desire." The Mahárájá having plucked off a hair from the tiger's skin put it in the fire; immediately Gosain Mahandar Gur arrived, and saw with his own eyes the newly made Jogi and Jigin. He embraced them all and said, "I committed the tiger's skin to you on purpose that you might set fire to one of the

وہ کھلاتی جو روپ چاہے سو دیکھاوے جو جو ناج چاہے سو فیضاوے
 بھجوٹ لڑکے کو کبا دینا تھا اودی بھان اور سورج بھان اُسکے باپ کو
 اور لچھمن پاس کو میں نے کیا تھا میرے آگے اُن تینوں کو جیسے کا
 تینما کرنا کچھ برسی بات نتھی اچھا ہوئی سو ہوئی اب چلو اُنھو
 اپنی راج پر براجو اور بیدا کا نہائہ کرو اب تم اپنی بیتی کو سمیتو
 کنور اودی بھان کو میں نے اپنا بیتا کیا اور آسکو لیکے میں بیاہنے
 چڑھونگا مہاراج یہہ سنتے ہی اپنے راج کے گدی پر آبیٹھے اور
 اُس کھڑی کھہ دیا سارے چھتوں کو اور کوئی گوئے سے
 مذکھ لواور ہونے روپے کے روپیلے سفہرے سب جہاڑ اور پھاڑوں پر
 باندھہ دو اور پیڑوں میں موتی کی لڑپاں گوندھو اور کھہ دو چالیس

hairs when any thing particular happened to you. But in this your present condition what have you been doing? Have you been sleeping all this time? As for that playful damsels you might have shewn her whatever amusements she desired, and if she wished to dance you might have indulged her. But why give the ashes to a girl? As I changed into deer Uday-bhán and his father Súraj-bhán and his mother Lachmí Bás, it would have been no great difficulty to restore all three to the former shape. Well, let by-gones be by-gones. Now rise up, enjoy your kingdom, and make preparations for the marriage. Do you now call your daughter to you. I have adopted prince Uday-bhán for my son, and I am about to get him married." As soon as the Mahárájá heard this, he returned to his kingdom and seated himself on the throne. He then immediately issued a proclamation that the people should cover every story of their houses and the roofs with gold lace, and should bind on the bushes and hills gold and silver garlands, and should weave strings of pearls in the trees; and "give this order," said he, "that I shall be displeased with whatever family does not keep up the dancing

دن چالیس رات تک جس گھر ناج آنہہ پھر ذرہیگا اُس گھر والے سے میں روئہ رہونگا اور جانوںگا یہہ میرے دکھ سکھہ کا ساتھی نہیں چھہ مہینے جد کوئی چلنے والا کہیں نہ تھے اور رات دن چلا جائے اس ہیر بھیر میں وہ راج سب تھا کہیں یہی ڈول ہو گیا *

جانا مہاراج اور مہارانی اور گسانیں منہدر گرکا رانی کیتکی کے لینے کے لئے

پھر گروجی اور مہاراج اور مہارانی مدن بان کے ساتھ وہاں آپنے چہاں رانی کیتکی چپ چاپ سون کھینچی بیٹھی تھی گروجی نے رانی کیتکی کو اپنے گود میں لیکے کنور اودی بہاں کا چڑھاوا چڑھا دیا اور کہا تم اپنے ماں باپ کے ساتھ اپنے گھر سدھا رہو اب میں اپنی بیٹتے کنور اودی بہاں کو لئے ہوئے آتا ہوں گروجی گسانیں جنکو ڈنڈوت ہی سو تو ووں سدھارتے ہیں آگے جو ہو گی

for forty days and forty nights, and shall know that that house is not my friend in the various fortunes that befal me." For six months the kingdom remained in this state of whirl and excitement, no one who could walk ever standing still, but keeping on the move day and night. Everywhere this was the order of the day.

The Mahárájá and the Maháráni and the Gosain Mahandar Gur go to fetch Rání Ketakí.

Then the Mahárájá and Mahandar Gur Gosain and the Maháráni along with Madan-bán arrived at the place where Rání Ketakí was seated in profound silence. The Guru Ji taking Rání Ketakí in his arms, made her an offering to prince Uday-bhán and said to her, " Go you home direct with your parents. I am coming immediately with my son, prince Uday-bhán." As to Guru Ji Gusain, on whom be

سو کہنے میں آویگی یہاں کی بیہہ دھوم دھام اور پھیلاؤ دھیان کیجئے مہاراجہ جگت پرکاس نے اپنے سارے دیس میں کہا یہہ پکار دیں جو بیہہ نکرے گا اُسکی بڑی گت ہوگی گانو میں آمنے سامنے تو بولئے بنا بنا کے سوھے کپڑے ان پر لگا دو اور گوت دھنک کی اور گوکھرو روپہلی سندھری اور کرنیں اور ڈانلک ڈانک رکھو اور جتنے بڑھہ پیدپل کے پرانے پرانے پیڑ جہاں جہاں ہوں ان پر گونوٹک پھولوں کی ستھری ہری بھری ایسی جسمیں سرسے لگا جو تک آذکی تھلک اور جھلک پہنچے باندھہ دو جوتکہ پوڈھوں لی ارکاب سوھے جوڑے پہنچے سو پانوں میں ڈالیوں نے توڑے پہنچے بوئی بوئی نے پھول پھل کے گھنے جو بہت نتھے تو تھوڑے تھوڑے پہنچے جتنی ڈھنڈھی اور ہریاول میں لہلہی پات تھی اپنے اپنے ہاتھہ میں چھپھی مہندی کی رچاوت سجاوٹ کے ساتھہ جتنی سماوٹ میں سما سکے کرلی اور جہاں تک نول بیاہی دلہنیں

blessings, he indeed goes as he had said. What happened afterwards shall be related; as here you have to consider only the pomp and display. Mahárájá Jagat Prokás ordered it to be proclaimed throughout his country that great troubles awaited those who were disobedient. In every village at the very entrance they were to build a new three-arched house, to cover it with red cloth,—and to sew upon the cloth embroidered fringes, small bells, lace, and tinsel. And on all the banyans and pipal trees, whether young or old, wherever there are trees, they were ordered to hang garlands covered with flowers made of lace, so that their brightness and quivering motion might extend from the summit to the root. “The young plants have painted themselves and are clad in red garments. The branches have put on ornaments on their hundred feet. The twigs have arrayed themselves in jewelled fruits and flowers, some with many, and some with few.” All the fruits and leaves that were in

نئھیں پہلیوں کے اور سہاگذیں نئی نئی کالیوں کے چوڑے پکھریوں کے پہنچی ہوئی تھیں سب نے اپنی اپنی گود سہاگ پتار کے پہول اور پہلوں سے بھر لی اور تین برس کا پیسا جو لوگ دیا کرتے تھے اُس راجہ کے راج بھرمیں جس جس ڈھب سے ہوا کھینچی باری کر کے ہل جوت کے اور کپڑا لدا بیچ کھونج کے سو سب آنکو چھوڑ دیا اپنی گھروں میں بناؤ کے تھائیہ کریں اور جتنے راج بھرمیں کوئی تھے کھنڈ سالونکی کھنڈ سال لیچا آن میں اونڈیلیں گدیں اور ساری بخون میں اور پہاڑ تلیوں میں لال ٹیندوں کے بھار جھمگماہت راتوں کو دیکھائی دیتے لگے اور جتنی جھیلیں تھیں آن سب میں کسم اور تیسو اور ہر سنگار تیرگیا اور کیسری بھی تھوڑی تھوڑی گھولنے میں آکئی اور پنک سے لگا جرنٹک جہاز جہنگاروں میں پتے اور پتیوں کے بندھی چھتی تھی اور روپہلے سنہرے ڈانٹک گوند لکا لگا کے چیکا دی اور کھدیا گیا

verdure and greenness adorned their hands all over with the beautiful dye of the myrtle: and wherever the newly married brides had put on bracelets of small pods and the favourite wives bracelets of new buds, all of them filled their bosoms with the flowers of favour and love. And three years' taxes were remitted throughout the whole of the kingdom to all the people in whatever way it could be done, whether on the fields and gardens, or on the ploughing, or on the selling of cloth and rags; and it was ordered that all should make preparations in their houses to celebrate the wedding. And into all the wells of the whole kingdom were poured the contents of the sugar factories. And in all the forests and mountains and hillocks the glittering of lanterns was seen all night long. And in all the lakes, the bastard saffron, blossoms of the palás tree, and flowers of the weeping Nyctanthes were lying. And a little saffron also was mixed with the water, and from the summit to the roof, on

جو سوہی پگڑی اور سوہی بانگی بن کوئی کسی ڈول کسی
روپ سے نہ پھرے چلے اور جتنے گونے نچوئے بھاند بھکتی ڈھاری
اور سذکیت ناچتے ہوئے ہو مہب کو کھدیا جن جن گانوں میں
جہاں جہاں ہوں اپنی اپنی ٹھکانوں سے ملکراچھے اچھے بچھوئے
بچھا کر گاتے گاتے دھومیں مچاتے ناچتے کوہ تے رہا کریں *

قہونقنا گسائیں مہندر گر کا کنور اودھی بھان اور اُسکے ماں
باپ کو اور نپانا اور بہت سا تملانا راجہ اندر کا اُسکی
چتھی پڑھے آنا

یہاں کی بات اور جھلپیں جو کچھہ ہیں سو یہیں رہنے دو اب
آگے بھی سذنوجوگی مہندر گر اور اُسکے نوے لاکھہ انتیوں نے سارے
بن کے بن چھان مارے کھلپیں کنور اودھی بھان اور اُسکے ماں باپ کا
ٹھکانا نہ لگا تب آن نے راجہ اندر کو چھی لکھہ بھیجی اُس

all the leaves of all the brambles they stuck gold and silver foil with gum. And the king ordered that no one should by any means go out to walk without a red turban and a red dress: and that all the singers and dancers and actors and mimics, musicians and those who dance the sangit, wherever they were, should leave their abodes, and having spread comfortable beds, should continue singing, playing, dancing, shouting, and leaping.

Gosain Mahandar Gur seeks prince Uday-bhán and his father and mother—does not find them, and is greatly distressed—king Indra having read his letter, comes to him.

Let us break off here the story of these amusements. Now listen to what is to come. The Jogi Mahandar Gur and his ninety lakhs of disciples marched throughout the whole forest, but nowhere could any traces of Uday-bhán and his father and mother be found. Then

چھی میں بھی لکھا ہوا تھا تینوں جنوں کو میں نے ہرن اور ہر نی
کردا لا تھا اب آن کو ڈھوندھتا پھرتا ہوں کہیں نہیں ملتے اور میری
جتنی سکت تھی اپنے سے کرچکا ہوں اور اب میرے مذہب سے
نکلا کنور اودی بھان میرا بیٹا اور میں آسکا باپ آسکی سسرال میں
سب بیاد کے تھا تھہ ہو رہی ہیں اب مجھہ پر نیت گازہ ہی جو
تمسے ہو سکے سو کرو راجہ اندر گرو مہندر گر کے دیکھنے کو سب
اندر اسن سمیت آپ آن پہنچتا ہی اور کہتا ہی جیسا آپ کا بیٹا
تیسا میرا بیٹا آپ کے ساتھ میں سارے اندر لوگ کو سمیت کے
کنور اودی بھان کو بیاہنے چڑھونکا گسانیں مہندر گرفے راجہ اندر
سے کہا ہمارے آپ کے ایک ہی ایک بات ہی پر کچھہ ایسی
سو جھائی جسمیں وہ اودی بھان ہاتھہ اویں بھاں جتنے گوئے اور

he wrote and sent a letter to king Indra. The letter ran thus : " I am now seeking those three persons whom I changed into deer, but cannot find them anywhere, and I have exhausted all my powers. The word has gone out of my mouth that Uday-bhán is my son and I am his father. In his father-in-law's house preparations are made for his marriage. I have now fallen into a great difficulty. Do what you can for me." King Indra came with all (the attendants of) his throne to see the Guru Mahandar and said, " He is my son, as also he is thine. I will put myself in conjunction with you and all the inhabitants of Indra to get Uday-bhán married." Gosain Mahandar Gur said to king Indra " What thou sayest I also say ; but do thou shew me some means of finding Uday-bhán." King Indra said, " We will take all the singing men and singing women and traverse all the forests. Somewhere or other we shall find him." The Guru Jí said, " Well."

The deer forget the sport peculiar to themselves :
The wonderful transformation into the shape of deer ceases,
And prince Uday-bhán and his father
And mother are restored to their former shapes.

کابن ہیں ان سب کو ساتھہ لیکھ ہم اور اپ سارے بذوں میں پھریں
کہیں نہ کہیں تھکانا لگ جائیدا *

ہرن اور ہرنیوں کے کھیل کا پکڑنا اور نئے سر می
کنوراودی بھان کا روپ پکڑنا

ایک رات راجہ اندر اور گسائیں مہندر گر نہری ہوئی
چاندنی میں بیٹھے ہوئے راگ سن رہے تھے کروڑوں ہرن آس پاس
آن کے راگ کے دھیان میں چوکری بھول سر جھکائے کھڑے تھے
اس میں راجہ اندر نے کہ وہاں سب ہرنیوں پر پڑھ کے میرے
سگت گرو کے بھگت بھواری مختربی ایسری باچا ایک
چھینٹا پانی کا دو کیا جانے وہ پانی کیا تھا پانی چھینٹے کے ساتھہ
ہی کنوراودی بھان اور انکے ماں باپ تینوں جنہیں ہرنیوں کا روپ
چھوڑ کر جیسے تھے ویسے ہو جاتے ہیں مہندر گر اور راجہ اندر ان
تینوں کو گلے لگاتے ہیں اور پاس اپنے بڑی او بھگت سے بٹھاتے
ہیں اور وہی پانی کا گھرہ اپنے لوگوں کو دیکر وہاں پہنچوا دیتے

One night king Indra and Gosain Mahandar Gur sitting in the clear moonlight were listening to songs. Thousands of deer stood by with their heads bent in attention to their singing, deeply fascinated. Thereupon king Indra said, "Having recited over these deer, the words of my power and the Guru's piety with the mantra *Isrī Búchá* sprinkle each of them with water." What sort of water could that have been! As soon as it was sprinkled prince Uday-bhán and his father and mother, all three, leaving the form of deer returned to their former shape! Gosain Mahandar Gur and king Indra embraced all three, and seated them near themselves with great tenderness, and giving to their people the jar of water which they had used sent it as a present to those who were unfortunate. When the people of king Indra recited the mantra *Isrī Búchá* and

ہیں جہاں سرمنداتے ہی اولے پرے تھے راجہ اندر کے لوگ جو
پانیکے چھینٹتے وہ ہی ایسروی بacha پڑھکے دیتے ہیں جو جو مر ملتے
تھے سب آئھہ کھرے ہوتے ہیں اور جو جو ادھموئے ہو کے
بھاگ پسے تھے سب سمت لئے ہیں راجہ اندر اور مہندر گر کنور
اوڈی بھاں اور راجہ سورج بھاں اور رانی لچھمن باس کولیکار ایک
اُڑن کھٹو لے پر بیدھہ کر بڑی دھوم دھام سے آنکی اپنی راج پر
بیدھا کر بیباہ کے تھاٹھہ کرتے ہیں پنسیلیوں ہدیرے موتی اُن سب
پونچھاوار ہوتے ہیں راجہ سورج بھاں اور اوڈی بھاں اور آنکی مان
رانی لچھمی باس چت چاہے آس پر پھولوں اپنے آپ میں
نهیں سماتے اور سارے اپنے راج کو یہی کہتے جاتے ہیں
جونوں بھوڑوں کے منڈھہ کھول دو اور جس جس کو جو جو
اوکت سوچیج بول دو آج کے دن سے اور کونسا دن ہوگا ہماری
آنکھوں کے پتلیوں کا جس سے چین ہی اُس لائے اکلوتے کا بیباہ

sprinkled the water, all who were dead and in their graves rose again, and all who, though half dead, had escaped their final destiny were restored by it.

King Indra and Mahandar Gur having taken prince Uday-bhán and king Suráj-bhán and queen Lachmi Bás on a flying couch with great noise and pomp, seated them on their throne, and began to make preparations for the marriage. Diamonds weighing five seers, and pearls, were presented to all of them. King Suráj-bhán and prince Uday-bhán and queen Lachmi Bás having obtained their heart's desire and hope could not contain themselves for joy, and the king ordered his servants to open the mouth of the treasure-house for his whole kingdom, and also that any one who might think of any new means of giving enjoyment to them should mention it—"What day will be like to-day. The marriage of our dear and only son who is the delight of the pupils of our eyes is to take place; and

اور ہم تینوں کا ہر فوں کے روپ سے نکل کر پھر راج بیدھنا پڑے یہہ
چاہئے جن جن کے بیدھیاں بن بیدھیاں کذواریاں بالیاں ہوں اُن سب
کو اتنا کرو جو اپنی جس جس چاؤ چوچ سے چاہیں اپنی
اپنی گریاں سنوار کے اُتھا دیں اور جب تلک جیتی رہیں
ہمارے یہاں سے کھایا پیا پکایا ریندھا کریں اور سب راج بھر کی
بیدھیاں سدا سماں گذھیں بذی رہیں اور سوھ راتے چھت کبھی کوئی
کچھہ نپھنا کریں اور سونے روپے کے کواز گنگا جمنے سب گھروں
میں لگجائیں سب کوئھوں کے مانھوں پر کیسر اور چندن کے ٹیکے
لگے ہوں اور جتنے پھر ہمارے دیس میں ہوں اتنے اتنے ہی روپے
سوئے کے پھر امنے سامنے کھوئے ہو جائیں اور سب ڈاکوں کے
چوئیاں صوتیوں کے مانگ سے بن مانگے بھر جائیں اور پھولوں کے
گھنے اور بند نواروں سے سب چھار پھر لدے پھندے رہیں اور اس
راج سے لکا اُس راج تلک آدھر میں چھت سے باندھہ دو جپا جپا

all we three are restored to our shapes and our kingdom. This is the first thing we must do : to all those who have unmarried daughters let enough be given for arraying their daughters with ornaments and getting them married ; and let them eat, drink, cook, and dress their food from our palace as long as they live. And let the daughters of all the land be never deprived of their husbands, and let them not wear any but red-dyed clothes, and let doors of gold and silver, like the mixing of Gangá and Jamná, be set up in the houses ; and on the roofs of the houses let *tikas* of saffron and the sandal wood be applied, and let models of all the hills in our country be made of gold and silver and set up opposite one another, and let the locks of the ugly shrews who are too surly to ask, be filled with rows of pearls, and let the thickets and hills be covered with flowers and festive wreaths, and let these wreaths be suspended so as to serve for a covering from this kingdom to that ; and let there not

کہہش نر سبھ جہاں بھیت پہلکا دھوم دھوکا نہو چاہئے پھول اتنی بہت
ساری کھنڈ جائیں جوندیاں جیسی سچ مج پھول کے بھتیاں ہیں
یہہ سمجھا جائے اور یہہ قدو جدھر سے دو لہ کو بیاہنے
چڑھیں سب لاٹی اور ہیوے اور پکھڑا ج کی ادھر ادھر کنوں کی
تیباں بن جائیں اور کیاریاں سی ہو جائیں جنکے بیچوں بیچ سے
ہو نکلیں اور کوئی ڈانگ اور پہاڑ تلے کا اتار چوہا و ایسا دیکھائی
نہ سے جسکی گود پکھروں اور پھلوں سے بھرے بھتوں نہو *

راجہ اندر کا تھاٹھہ کرنا اودھی بھان کے بیاہنے کے لئے

راجہ اندر نے کہہ دیا وہ رندیاں چلبیاں جو اپنے مددھ میں
اڑچلبیاں ہیں آن سے کھدو سولہ سنگار بال بال کجھ موتی پرورو اپنی
اپنی اچرج اور اچندیع کے آن کھتوں کے اس راج سے آس راج
تلک ادھر میں چھت سے باندھ دو پر کچھہ ایسے روپ سے اور چلو
جو اورن کھتوں کی کیاریاں اور پھلواریاں سی سیدھروں کوس تلک

be a spot of land on which there is no assembly of men, and rejoicing. And let many flowers be so scattered every where that even the rivers may appear to be rivers of flowers. And on the road by which the bridegroom will come, let screens made with mica and coloured paper be set up covered with rubies, diamonds and topazes, and let them be like beds of flowers for the bridegroom to walk between, and let as moors or mountains or valleys appear, whose bosoms are not covered with feathers and flowers.

King Indra makes preparations for the marriage of Uday-bhán.

King Indra said, "Order those cunning women who are flying aloft in stately array to ornament themselves and make a covering from this kingdom to that out of their wondrous flying couches, and let them fly in such a way that the couches may appear like flower-beds, extending a hundred cos. And on this side and on that, let

ہو جائیں اور اور اوپر ہی اوپر مودنگ میں جلنگ منہ چنگ
گھونگرو تبلے کت تال اور سیکروں اس دھب کے انوئیج باجے بجتے
آنیں اور آن کیاریوں کے بیچ میں ہیرے پکھراج ان بندھے موتیوں
کے جھاڑ اور لال ٹیندوں کے بھیڑ بھاڑ کی چھمچھماہت دکھانی دے
اور آنہیں لال ٹیندوں میں سے ہتھپھول پھلچھڑی جاہی جوہیاں
کدم گیندا چنبیلی اس دھب سے چھٹے کہ دیکھتوںکی چھاتیوں کے
کواڑ کھل جائیں اور پتاخے جو اچھل اچھل کے پھوٹیں آن میں سے
ہنستی سپاری اور بولتی پکھروتی دھل دھل پڑیں اور جب تم
سبکو ہنسی آوے تو چاہئے آس ہنسی کے ساتھ موتی کی
لڑیاں جھریں جو سب کے سب اکنو چن کے رچکے راجی
ہو جاویں دومندیوں کے روپ میں سارنگیاں چھڑ چھڑ سوہیلے گاؤ
دونوں ہاتھہ ہاؤ آنگلیاں نچاؤ جو کسی نے نہ سنی ہو وہ تار بھاؤ
او جاؤ راؤ چاؤ دکھاؤ نہریاں کیکپاؤ اور نالک بھویں تان تان بھاؤ
بتاؤ کوئی بھوت کر رہ نجاو ایسا جاؤ جو لاکھوں برس میں ہوتا

them play on the drum, guitar, musical glasses, Jew's harp, tinkling bells, kettle-drum, cymbals, and hundreds of other extraordinary instruments. And between these flower-beds, let there appear the glittering of a multitude of lanterns and chandeliers ornamented with diamonds and topazes and pearls suspended in the air: and from those lanterns let all kinds of fire-works be let off so that the doors of the hearts of the spectators may be opened, and that the laughing betel-nut and the talking betel-chips covered with gold leaf may be thrown out of the leaping and bursting squibs. And when you all laugh, let the strings of pearls fall from your mouths along with your laughter, that all picking them up may be glad. Sing songs of praise to the fiddle in the manner of *dómnis*. Throw up both hands and make your fingers dance: shew them such a sport as no body has ever heard of before. Wag your cheeks and

ہی جو جو راجہ اندر نے اپنے مذہب سے نکلا تھا آنکھیں کے جھپٹی
کے ساتھ وہیں ہونے لگا اور جو کچھہ اُن دونوں مہاراجوں نے ادھر
آدھر کہدیا تھا سب کچھہ اُسی روپ سے تھیلک تھاک ہو گیا جس
بیانہ کی یہ کچھہ پھیلارت اور جماوت اور چارت اُپر تلے اس
جمکھت ساتھ ہو کہ اُسکا اور کچھہ پھیلوا کبا کچھہ ہو گا یہ دھیان

کرلو *

تھاٹھے گسانیں مہندر گر کا

جب کنور اودی بھان اس روپ سے بیانہ چڑھے اور وہ بامہن
جو اندر ہیری کوئی میں موندا ہوا تھا اُسکو بھی ساتھ لیلیا اور
بہت سے ہانہ جوڑے اور کہا بامہن دیوتا ہمارے کھنے سنے پر فجاو
تمہاری جوریت ہوتی چلی آئی ہی بتاتے چلوا یل اور کھتو لے پر
وہ بھی ریت بتانے کو ساتھ ہوا راجہ اندر اور گسانیں مہندر گر
ایراستہ ہائی پر جھومنے جھامنے دیکھتے بھالئے سارا اکھڑا لئے چلے

wrinkle the nose and eye-brows and set the tune. Let no one break the ranks; and accomplish in one moment a journey of lakhs of years." What king Indra had commanded began to take effect in the twinkling of an eye, and whatsoever those two Mahárájás on their respective sides ordered, was speedily accomplished. You may imagine, if you can, what more preparations were made for this marriage, after such preparations both in the earth and the air as I have described.

Preparations of Gosain Mahandar Gur.

When the prince Uday-bhán set out to be married in this manner and also took with him the Bráhman who had been shut up in a dark room and asked his forgiveness and said, "Oh Bráhman, do not deal with me according to what I have said and done to you, but perform all your customary rites," he then accompanied Uday-

جاتے تھے راجہ سورج بہان دولت کے گھوڑے کے ساتھ ملا جیتنا
ہوا پیدل تھا اتنے میں ایک سلطانا ہوا سب گھبرا گئے اُس سفافے سے
وہ جو جوگی کے نوے لاٹھہ اتیدت بنے سب کے سب جوگی بنے
ہونے متینوں کے لریوں کی سیلی گاؤں میں ڈالی گانتیاں اُسی
ذہب کی باندھی مرگ چھاؤں اور بگھمبروں پر آنہونکے جیوں
میں جتنی اُمنگیں چھا رہی تھیں وہ چوگنی پچنی ہو کہیں
سکھپال اور چندلوں پر اور رتھوں پر جتنی رانیاں مہارانی
لچھمن باس کے پیچے چلی آتی تھیں سب کو گدگدیاں سی
ہونے لگیں اس میں کہیں بھرتی کا سانگ آیا کہیں جوگی جیپال

bhán on a flying couch in order to perform the rites. Rájá Indra and Gosain Mahandar Gur proceeded with their train seated on the elephant Irápat rocking as they went and looking at every thing. King Suráj-bhán walked along-side the horse of the bridegroom counting his beads. Meanwhile a rumbling noise was heard: all were astonished: on hearing this the ninety lakhs of jogis, all of them being prepared with numerous pearl-necklaces on their necks and with their breasts similarly adorned, sitting upon the skins of deer and tigers, rejoiced with five-fold joy. All the princesses who attended queen Lachmi Bás in litters and chariots were laughing for joy. Meanwhile there appeared, here the mimes of the Bhartari actors, there Jogi Joypál, and there Mahádev and Párvati. Here Gorakh appeared, and there Muchandar Náth fled. Krishna also appeared under the form of a fish, a tortoise, and a stag. Here Parsíram, Báwanrup, Harnákis and Narsingh, there Rám, Lachman, and Sítá appeared. Here Rávan and the whole battle in Lanká, there the eighth-day festival after the birth of Kanhyá, and his carrying Páras Deo to Gokal and his growing up with all these wonders attending his history, and his feeding the cows, and his playing the pipe, and his sporting with the milk-maids, and his being devoted to the Hunch-back, and the forest of Kurail and the fig tree and the ghát where the Gopis undressed. There Bindraban, Sewáganj, Barsána

اکھر سے ہوئے کہیں مہاد بیو جی اور پار بنتی جی دیکھائی پڑی
گور کھہ جا گئے کہیں۔ مچھندر ناتھ بھائی کہیں مچھہ کچھہ بارہ سنگھا
ہووے کہیں پرسام کہیں باونروپ کہیں ہوناکس اور نرسنگھہ کہیں
رام لچھمن سیدنا سامانہنے آئی کہیں راون اور انکا کا بکھیرتا سارے کا سارا
دیکھائی دینے لگا کہیں کنهیا جی کا جنم اشتمیں ہونا اور پارس
دیو کا گوگل لیجانا اور انکا آس روپ سے بڑھہ چلنا اور گائیں چراں
اور موزلی بجانے اور گوپیوں رانی سے دھومیں مچھانے اور گُنجما کا
بس کرایدا اور وہی کریل کے کمینچپیں *

ہنسی پت چیرگھات

بذرائیں سیوا گنج برسانے سین رہنا اور اس کنهیا سے جو
جو کچھہ ہوا تھا سب کا سب جیوں کا تیوں آنکھوں میں آنا اور
جانا اور سولہ سو گوپیوں کا تملانا سامانہنے اگیا ان گوپیوں میں سے

appeared. And the whole history of Kanhyá appeared, just as it had happened before their eyes. And the agitation of the sixteen hundred Gopis appeared before them. And the Gopi who, seizing the hand of Udhó, caused all the Gopis to weep while she stooped to the ground and thus opened her heart: "When Kán, having left the bushes of the forest of Kurail came to dwell in Hardwár and built a house of *Magdhút* in order to be called a king of kings, having left his cap of peacock feathers and his blanket, has now entered into some new relationship with us, and has forgotten us after having assumed a new dignity and stolen our understandings."

The building of Gháts.

They astonished all the people by building all the gháts of the rivers in the two kingdoms of silver bricks. All kinds of boats adorned with gold were plying hither and thither on the rivers. These were crowded with singers and dancers of all kinds, who sang

اُردھو کا ہاتھہ پکڑ کر ایک گوپن کے آس کھنے نے سب کو رولا دیا
جو اس ڈھب سے بولکے روندھے ہوئے جی کو کھولتی تھی *

کبت

جب جہاز کریل کے کنجن کان ہردار جیوں ما جائی بسے
مگد ہوت کے ڈھام بذای کھنے مہرا جن کے مہراج بھئے
تج مور مکت اور کامریا کچھوا اور ہی نلتے جو رئے
دھرے روپ نئی اور گیاں چرائیوں بھول گئے
اچھا بننا گھاٹوں کا

جتنے گھاٹ دونوں راج کے ندیوں میں تج پکے چاندی کے
تھیکے سے ہو کر لوگوں کو ہکا بکا کر رہے تج نواتے بھولتے بھرے لچکے
مور پنکھی سونا مکھی سیام سند رام سند رام اور جتنی ڈھب کے
نادیں تھیں سدھری روپ سے سچی سجائی کسی کسانی سو سو
لچکیں کھاتیاں اتیاں جاتیاں لہراتیاں پڑھی پھرتیاں تھیں ان سب
پر بھی گوئی کنچنیاں رام جنیاں ڈومنیاں کھچا کھج بھری اپنی
اپنی کرتب میں ناچتی گاتی بجاتی کوڈتی پھاندتی دھومیں
مچاتیاں انگرائیاں جمہانیاں آنگلیاں فچاتیاں اور ڈھلی پڑتیاں تھیں
اور کوئی ناؤ ایسی نڈھی جو سونے روپے کے پتروں سے مذکوری
ہوئی اور اساوری سے ڈھی ہوئی نہو اور بہت سی ناؤ پر
ہندوالے بھی اسی ڈھب کے آن پر کائنیں بیدھی جھولتی ہوئیں

and played and danced according to their own manner, and leaped and sported and stretched themselves and yawned. And there was not a single boat which was not covered with gold and silver and handsome cloth. And on many of the boats swings were placed. Female singers sitting upon these and swinging warbled their songs

سوہنیلی کدارا ادر پاگیسری کانھر میں گارھین تھیں دلبادل ایسے
فوازونکی سب جھیلوں میں بھی چھارھی تھی *

آنہنچنا کنور اودی بھان کا بیاہ کے تھاتھے کے
ساتھے دلہن کے ڈیوراھی پر

اس دھوم دھام کے ساتھے کنور اودی بھان سہرا باندھے جب
دلہن کے گھرتلک آن پہنچا اور جو ریتیں انکے گھرانے میں ہوتی
چلی آتیاں تھیں ہونے لگیاں مدنیاں رانی کیتکی سے تھنھے ولی
کرکے بولی اب سکھہ سمیتی بھر بھر جھولی سر نہوڑائے کیا بیدھی
ہو اونہ تلک هم تم ملکے جھروکونسے آنہیں جہانگیں رانی کیتکی
نے کھا رے ایسی نلچی باتیں ہمسے نکر ایسی ہمیں کیا پڑی
جو اس گھری ایسی کڑی چھل کر ایل بیل میں آتھیں اور تیل
پھلیل بھری ہوئی انکے جہانگنے کو جا کھوڑی ہوں مدنیاں اس
رُکھائی کو اورن گھاؤ کے اینٹوں میں کربولے *

to the Kidára, Bagisiri, and Kánrhá tunes ; and the boats were spread over the surface of the lakes like clouds upon the face of the sky.

The arrival of Uday-bhán with the marriage preparations at the door of the Bride.

When prince Uday-bhán with all his preparations and with the bridal chaplet on his head, had arrived at the house of the bride, and when the usual customs of her family had begun to be performed, Madan-bán began to say to Rání Ketakí in joke, " You have found good fortune and have appropriated it; why then are you sitting with your head hung down. Come let us have a peep at them through the windows." Rání Ketakí said, " Do not say such shameless words to me. Why should we rise in so great a crowd as at present is assembled, and, with oil scented with flowers

دوہے اپنی بولی کے

دوہا

یوں تو دیکھو واچڑھی جی واچڑھی جی واچڑھی
 ہم سے اب آئے لگی ہیں آپ یوں مہری ٹری
 چھان ماری بن کے بن آپ نے جن کے لئے
 وہ ہرن جو بن کے مدد میں ہیں بنے دولہہ کھڑے
 تم نجاؤ دیکھنے کو جو انہیں کچھ بات ہی
 جھانکتے اس دھیان میں ہیں اُنکے سب چھوٹے بڑے
 یہی کھارت جی کو بھاڑے یوں ہی پور منڈیا ہلاے
 کے چلینڈے آپ کو ہم ہیں ایسے دھن پراڑے
 سانس نہذدی بھر کے رانی کیتکی بولی کہ سچ
 سب تو اچھا کچھ ہوا پر اب بکھیرے میں پڑے

sprinkled over us, stand up to peep at them?" Madan-bán interpreting these angry words as only an attempt to deceive, recited the following in her own language, "Bravo, you are trying to come it strong. That deer for whom you were searching from forest to forest, is standing before you as a bridegroom in the intoxication of youth. What do you mean by saying you will not go to see him? All both great and small are desirous of peeping at him. There is a saying, 'The heart says, Yes, the tongue says, No.' But I am determined to take you to him." Rání Ketakí heaving a sigh said, "True. Everything has turned out well: only I shall have nothing but jokes to endure."

واری پھیری ہونا مدن بان کا رانی کیتکی پر اور اُسکی
باس کا سونگھنا اور انندی ہن سے

آس گھری کچھہ مدن بان کو رانی کیتکی کے مانجی کا جوڑا
اور بھوپیں اور انکھریوں کا لیچانا اور بکھرا بھکرا جانا بھلا لگ گیا
تو رانی کیتکی بس سونگھنے لگی اور اپنی آنکھوں کو ایسا کولیا
جیسے کوئی کسی کو اونکھنی لگتی ہی ہر سے لگا پانوں تک واری
پھیری ہو کے تلوے سہلانے لگے رانی کیتکی جہت سے دھیمی
سے ہنسکے لپکا ساتھ لے اٹھی مدن بان بوی میری ہاتھ کے
آہو کے سے وہ ہی پانو کا چھالا دکھہ گیا ہوگا جو هرنوں کے آہوندھا
آہوندھہ میں پڑگیا تھا ایسے دکھتے چتکی کے چوت سے مسوس کر
رانی کیتکی نے کہا کانتا اڑا توڑا اور چھالا پڑا پر نگوڑی تو کبوں
میرا پنچھالا ہوئی *

Madan-bán's devotion to Ráni Ketakí, and the Ráni's smelling scents, and nodding, from excess of happiness, as with sleep.

Then Madan-bán was delighted at beholding Ráni Ketakí's wed-ding-suit, and eye-brows, and the modest appearance of her eyes, and her hair flowing over her face. Then Ráni Ketakí began to smell the scents and to close her eyes like one just falling asleep. Madan-bán with the utmost devotion to her whole person began to stroke the soles of her feet. Ráni Ketakí immediately smiling quietly pretended to writhe under this operation. "Oh! I see," said Madan-bán, "the rubbing of my hand pains the blister you got in searching for the deer." As she said this, Ráni Ketakí gave her a pinch and said, "If a thorn has stuck in my foot and made a blister what then? What business have you to reproach me?"

سراہنا رانی کیتکی کے جوین کا

رانی کیتکی کا بہلا لگنا لکھنے پڑھنے سے باہر ہی وہ دونوں بہزوں کی کھچاوت اور پتلیوں میں لاج کے سماوت اور نکیلیاں پلنکوں کے روند اہست اور ہنسی کی لگاوت دنتریوں میں مسیدوں کے اوداہست اور اندھی سی رکاوٹ سے ناک اور تیوری چڑھا لیندا اور سہیلیوں کا گالیاں دیندا اور چل نسلنا اور ہرنیوں کے روپ سے کرچھالیں مار ہری اوچھلنا کچھہ کھنے میں نہیں آتا *

سراہنا کنور جی کے جوین کا

کنور اودی بہان کے اچھے پین میں کچھہ چل نسلنا کسی سے ہونسکی ہوئی رہی آنکی اوبھار کے دنوں کا سہانا پن اور چال ڈھال کا اچھن بیچھن آنھتی ہوئی کونپل کے پہبند اور مکھڑے کا گدرایا ہوا جوین جیسے بترے نترے کے ہری بھری بھاروں کے گوہ سوچ کے کرن نسل اتی ہی نہیں روپ نہا آنکی بھگتی مسحون سے رہن کا

An account of the beauty of Ráni Ketaki.

Ráni Ketaki's beauty beggars all description. It is impossible to describe the arching of her eye-brows, the modesty of her eyes, the piercing of her sharp eye-lashes, and her smile, and the colour of the dye on her teeth, and her frown when angry, and the dignity with which she scolded her servants, and her walk, and her spring like the bounding of deer.

An account of the prince's beauty.

If any one surpasses prince Uday-bhán in beauty, let him appear —the beauty of his budding youth and the gracefulness of his gait, and the luxuriance of his sprouting hair, and the rosiness of his cheeks like the shining of the sun's rays early in the morning on

تپکا پرنا اور اپنی پرچھائیں دیکھہ کر اکونا جہاں تھاں چوانہہ اسکا
دول ٹھیک تھاک اُنکے پاؤں تلے جیسے دھوپ تھا *

دولہ اوی بھان کا سندگاسن پر بیتھنا

دولہ اوی بھان سندگاسن پر بیتھنا اور ایدھر اردھر راجہ اندر اور
جوگی مہندر گرجم گئے دولہ کا باپ اپنی بیتی کے پیچے ملا لئے
کچھ کچھ گذگذا نے لگا اور ناج لگا ہونے اور ادھر میں جو اوزن
کھٹولے اندر کے انہارتے کے نجے سب کے سب اس روپ سے چھت
باندھ شہر کا کئی مہارانیاں دونوں سمدھنیں اپس میں ملیاں
جلیاں اور دیکھنے داکھنے کو کوئی ہوں پر چندن کے کوازوں کے اڑتوں
میں آبیتھیاں سانگ سندکیت بھندتاں ہس ہونے لگا جتنے راگ
اور راگنیاں تھیں یمن کلیاں جھجونٹی کاندڑا کھدا پچ سوہنی برج
بھاگ سوہرت کانگڑا بھیروعی کھت للت بھیروں روپ مکری
ہوئی سچ مچ کے جیسے گلنے والے ہوتے ہیں اپنے اپنے سبمیں

the bosom of spring, the dropping of beauty from his first-shooting moustache, his pride on beholding his shadow, and the reflection of his shape as bright as the sun.

Uday-bhán sitting upon his Throne.

The bridegroom Uday-bhán seated himself on the throne, and on this side and on that Rájá Indra and the Jogi Mahandar Gur assembled with their trains. The father of the bridegroom standing behind his son with beads in his hand began to mutter something, and the dance began. In the air all the attendants of the Court of Indra who had come on the flying couches danced with expressive action, forming, as it were, a roof over the spectators' heads. The two queens, the mothers of the bride and bridegroom, embraced one another, and sat on an upper floor behind sandal wood doors

گانے لگے اور گانے لگیاں اس ناچ کا جو بھاؤ تاؤ رچاوت کے ساتھہ
ہوا کسکا منہہ جو کہہ سکے جتنے کے سکھہ چین گھرتیہ مادھو
بلس رس دھام کش تو اس مچھی پھون چندر بھون سب کے سب
لپپی سے لپپی اور سچی موتیوں کے جھالریں اپنی اپنی گاندھہ
سمیتی ہوئی ایک پھپن کے ساتھہ متوالوں کے روپ سے جھوم جھوم
بیدھنے والوں کے منہہ چوم رہی تھی بیچوں بیچ ان سب گھریوں کے
ایک آرسی دھام بنا یا تھا جسکی چھت اور کواز اور آنگن میں آرسی
چھت کھیں لکڑی است بھر کے پت ایک آنگای کے پوری بھر
نہی چانی کا جوڑا پہنے ہوئے چودھویں رات جب گھری چھہ
ایک رہ گئی تب رانی کینکی سے دلہن کو اُس ارسی سبھوں میں
بیہنائکر دلوہ کو بلا بیٹھجا کنور اودھی بھان کھیبا بنا ہوا سر پر مکت
دھرے سہرا باندھے اُسی تزاوے اور جمگھت کے ساتھہ چاند سا
مکھرا لئے ہوئے جا پہنچا جس جس ڈھب سے بامہن اور پندت
کھتے گئے اور جو جو مہاراجوں میں ریتیں چلی اتیاں تھیں اُسی
دول سے اُسی روپ سے بھونری گندھہ جوڑا سب کچھہ ہولیا *

to see the festivities. Masks, music, and clowns began to appear. All kinds of songs, namely, Yaman, Kalyán, Jhanjoti, Kánrhá, Khambáj, Soni, Paraj, Behág, Surat, Kángrá, Bhairawi, Khat, Lalit, Bhairon, taking the form peculiar to itself, began to sing exactly like human beings. Who can describe the pleasantness of that dance? In all the houses devoted to festivity, viz.: Mádhó Bilás, Ras Dhám, Kishan Niwás, Machhi Bhowan, Chandar Bhowan, women, all of them with dresses covered with brocade, with fringes of real pearls attached to them, rolling about as if they were intoxicated, were kissing those who were sitting there. In the middle of these houses a saloon surrounded with mirrors was built, in the roof and door and compound of which there was nothing but glass, not even

دو ہے اپنی بولی کے

اب اوہ حب بیان اور رانی کیتکی دنوں ملے

آس کے جو پیوں کمال نہ ہوئے تھے پھر کھلے

چین ہوتا ہی نتها جس ایک کو آس ایک بن

روہنے سہنے سونگے آپس میں اپنے رات دن

ای کھلاڑی یہہ بہت تھا کچھہ نہیں تھوڑا ہوا

آن کر آپس میں جو دنوں کا گذھ جوڑا ہوا

چاہ کے ڈوبے ہوئے اسی میرے داتا سب تریں

دن پھرے جیسے انہوں کے ایسے اپنے دن پھریں

وہ اور ان کھنڈوں والیاں جو اردہر میں چھت باندھی ہوئی

تھرک رہی تھیں بھر جھولیاں اور منھیاں ہیبرے اور موٹیوں

سے نچھا اور کرنے کے لئے اتر آنیاں اور ان کھنڈوں جو نکے توں ادھر میں

so much as a morsel of wood or putty. Having dressed the bride, Rání Ketakí, in wedding-garments, and having seated her in this saloon, when it wanted six hours of the fourteenth night, they sent for the bridegroom. Prince Uday-bhán, in the form of Krishna, with a crown on his head, and a wreath over his face arrived with pomp and attendants, like the moon at its rising. The recitations of the Bráhmans and Pandits, the customs which obtain among kings, the going round the bride and bridegroom, and the tying of the knot, all were duly performed. "Now Uday-bhán and Rání Ketaki have met: the flower of hope which had withered has bloomed again: when each was separate from the other they had no rest, and so they began to live with one another day and night. Oh hearer! this tying of the knot is much, what I have described is little or nothing. Oh Beneficent one, let all those who are drowning in a sea of love be saved. May my fortune change as theirs has." The damsels on the flying couches, who were dancing in the air,

چھت باندھی ہوئی کھڑی رہی دولہ دلہن پر سے ساتھہ ماتھہ
ہیرے داری پیغیری ہوتے ہیں پس پس گیان اور آن سبھوں
کو جنکی سے اگ گئی راجہ اندر نے دلہن کے منہہ دکھائی میں
ایک ہیرے کا اکڈا چھپر کھت اور ایک پیڑھی پکھراج کی دی
اور ایک پا اجاتکا پودھا جسے چڑھل مانگنے سوھی ملی دلہن کے
سامنے لگادیا اور ایک کامروہیں گائی کی پتھیا بھی آسکے نیچے باندھہ دی
اور اکیدھن لونڈیاں آنھیں اور آن کھٹولے والیوں سے چن کے اچھی سے
اچھی سترھری گاتی بجاتیاں ستی پروتیاں سکھر سے سکھر سونپیں
اور آنھیں کھدیا رانی کیتکی جھت آنک دولہ سے کچھہ بات چیت
ذوکھیو تمہاری کان پہلے سے مسوری دیتا ہوں نہیں تو سب کے
سب پتھر کے م سورتیں بن جاؤ گے اور اپنا کبا پاؤ گے اور گسانیں
مہندر گردھی نے باون تولے پاوارتی جوستی ہیں آسکے اکیس
منکی اگ رکھہ کے کھا یہہ بھی ایک کھیل ہی جب چاہئے تو

having formed a canopy over the earth, came down to distribute as an offering for the newly married pair, bags and handfuls of diamonds and pearls. The flying couches still remained in the air like a canopy. In the ceremony of going round seven times by way of offering there were so many that they were crushed together. And the female servants were dazzled at the sight. Rájá Indra at his first visit to see the bride gave her a bed made out of a single diamond, and a stool made of a topaz, and placed before the bridegroom the bough of an unknown tree which affords whatever fruit one desires to have, and the calf of the cow Kámdhen tied beneath it, and having selected out of the flying-couch-damsels twenty-one of the most beautiful maids who could sing and play, chaste, obedient, without blemish, gave them to him, and ordered them to converse with Rání Ketákí but not with the bridegroom. "I give you warning before," said he, "otherwise you will all be changed

بہت ما نانبا گلا کے ایک اندی سی اسکی چھوڑ دیجے گا کنجیں
 ہو جائیگا اور جوگی نے یہہ سبھوں سے کھدیا جو لوگ آنکی بیا
 میں جائے ہیں آنکے گھروں میں چالیس دن چالیس رات سونیکی
 تدیوں کے روپ میں ہیں برسیں اور جب تک جئیں کسی بات
 کو پھر نترسیں نو لاکھہ نداوے گائیں سونے روپے کے سندھوں کے
 جزاً گھنا پہنچے ہوئے گھنگرو جھیجناتیاں بامہدوں کے دان ہوئیں اور
 سات برس کا پیسا سارے راج کو چھوڑ دیا بائیس سی ہاتھی اور
 چھتیس سی اونٹ لدے ہوئے روپوں کے لئائے کوئی اس بھیر
 بھاڑ میں دونوں راج کا رہنے والا ایسا نرہا جسکو ڈھوڑا جوڑا روپوں کا
 توڑا سونیکی جزاً کرنکی جرتی نہ ملی ہو اور مدنبنان چھت
 دولہ دلہن پاس کسی کا ہواً نتها جو بن بلائے چلی جائے بن
 بلائے دورتی آئے تو وہی آئی اور ہنسائی تو وہ ہی ہنسائی رانی

into stone, and be punished according to your doings." And Gosain Mahandar Gur having placed twenty-one jars of what they call elixir, said "This is also a wonderful thing. When you choose you can melt a quantity of copper and convert it into gold by pouring eight barley-corns of this elixir into it." And the Jogi said to all of them, "It shall rain coins in the shape of golden locusts forty days and forty nights in the house of those who have attended without sleeping upon the marriage of these persons, and as long as they live they shall never be in want." And he gave to the Bráhmans nine lakhs and ninety-nine cows with gold and silver horns, and with jewels on their bodies, and tinkling bells on their feet. And he remitted to the people seven years' taxes; and he placed at the disposal of any who chose to take them, twenty-two hundred elephants and thirty-six hundred camels laden with silver. And there was no inhabitant of either of the two kingdoms who did not receive a horse, a suit of apparel, a bag of rupees, and a pair

کیتکی کے چھپرے کو آنکے کنور اودھی بہان کو کنور کنور اجی کہئے
پکارتی تھی اور اُسی بات کو سو سو روپ سے سنوارتی تھی *

دوہے اپنی بولے کے

گھر بسا جس رات اُنہوں کا تب مدن بان اُسکھڑی
کہہ گئے دولہ دلہن کو ایسی سو باتیں کری
باس پاکر کیوڑے کی کیتکی کا جی کھلا
سچ ہی ان دوتوں جنوں کو اب کسی کی کبا پڑی
دلہن نے اپنی گھونگت سے کہا
جی میں آتا ہی تیرے ہونڈوں کو مل ڈالوں ابھی
بلے ای رندھی تیری دانتوں کی مسی کی دھڑی

of bangles set with gold. Besides Madan-bán there was no one who was bold enough to go into the presence of the bride and bridegroom without being called. And without permission no one could run backwards and forwards and laugh and joke with them except Madan-bán. And she kept calling prince Uday-bhán by familiar names in order to tease Rání Ketaki, and made sport of her in a hundred other different ways. On the night on which the bride and bridegroom went to their new home Madan-bán said a hundred sharp things to them, viz.: *Ketaki* having smelt the *keora* has blossomed. Who cares now about these two? Then the bride smiling said from beneath her veil, Oh woman, with such beautiful *missi* spread on your teeth, I have a good mind to give you a slap and rub it off.

CHUSAN SHELLS.

*Described by W. H. BENSON, Esq., Bengal Civil Service. Collected
by Dr. T. CANTOR.**

The following memoir was written so far back as 1841, and was embodied by Dr. Cantor in his ' Descriptive Catalogue of animals collected at Chusan' drawn up by order of Government, as already explained in an editorial note which will be found at p. 624, of the last Vol. of this Journal. Dr. Cantor's report was not as intended, published at a time when the result of his observations would have excited the most interest, and what were novelties in 1841, have subsequently been described and made known, by other zoologists. Mr. Benson's memorandum, however, on the Chusan Shells is so complete in itself and so likely, notwithstanding the time which has elapsed since it was written, to prove of assistance to Indian Conchologists, that the Editor has obtained the author's permission to publish it.—ED.

INCILARIA.† Nov. gen.

Corpus elongatum, posticè attenuatum, repens, undique velo marginatum. Tentaculis quatuor, superioribus oculiferis, inferioribus integris. Foramen commune latere dextro, non procul ab extremitate anticâ veli situm.

* *List of Shells, presented to the Museum of the Asiatic Society, by DR. CANTOR,
in 1842.*

1.—*From Chusan.*

Helix raviga, Benson.

— *tapeina*, Benson.

— *naninoïdes*, Benson.

Clausilia pluvialis, Benson.

— *aculus*, Benson.

Achatina erecta, Benson.

Planorbis papyraceus, Benson.

— *hemisphœrula*, Benson.

— *compressus*, Hutton.

Limnaea plicatula, Benson.

— *minor*, Benson.

Paludina quadrata, Benson.

— *lecythoides*, Benson.

— (*Bithinia*) *longicornis*, Benson.

— (*Bithinia*) *striatula*, Benson.

† From *Iucile*, a gutter, with reference to the gutter-like channel, which divides the mantle from the foot.

This animal is clearly not a slug (*Limax*.) from the occurrence of a general, instead of a partial shield, which covers the body nearly to the extremity like a mantle. It differs, however, from *Onchidium*, Buchanan, *Vaginulus*, Cuvier, and *Veronicella*, Blainville, in having the common orifice at the right side and near the posterior extremity under the mantle, but in the anterior part of the mantle as in *Arion*. From *Onchidium* it differs also in having the lower tentacula or appendices whole, and not bifurcate or palmated. The animal forms a connecting link between *Arion* and *Onchidium*. I have not access to any description of *Phylomique* or *Eumele*, indicated in p. 153, Rangs Manuel des Mollusques, as brought to De Ferrussac's notice by M. Rafinesque.

Melania cancellata, Benson.

Batillaria zonalis, Benson.

Dreissena purpurascens, Benson.

Modiola senhousia, Benson.

Anodon gibbum, Benson.

Corbicula fuscata, Lamarck.

Venus sinensis, Lamarck.

Sangvinolaria iridescentia, Benson.

Arca galactodes, Benson.

2.—From Macao.

Helix similaris, Benson.

Achatina erecta, Benson.

Succinea — ?

Littorina — ?

Littorina — ?

Mytilus — ?

3.—From various localities.

Placuna placenta ?

This shell is used by the Chinese as a substitute for panes in windows. Several junks, loaded with these shells, arrived at Chusan, in 1840. They were said to be collected on the shores of Formosa, and the Loo-choo Islands.

Placuna ? Found in a house in Ting-haé.

Pecten. Found in a house in Ting-haé.

Haliotis. From the Island of Quel-paert.

Agaricia, (Lamouroux). This beautiful undescribed Madrepore is said to inhabit the shores of Chin-choo, (Fokien Province).

INCILARIA BILINEATA, Benson.

Corpo livido, velo punctis maculisque fuscis conspersis ornato, lineis duabus lateralibus nigrescentibus, unico obscuriore mediano strigato.

" * Found in the earth under the roots of trees. Great numbers were seen at night above ground on plants and trees, also on rainy days, when they appear suddenly. This slug appears to be a favourite prey of a toad (*Bufo gargarizans*, Cantor) which swarms at night, and on rainy days, and I once observed a spider, (*Latrodectus limacida* Cantor MS,) seize one of these slugs. The Chinese apply the slug as a poultice for bruises, &c. The respiratory orifice is very minute. The sketch represents a good-sized specimen creeping on *Stillingia sebifera*."

HELIX RAVIDA, Benson.

Testa subglobosâ, umbilicatâ, epidermide olivaceâ, anfractibus sex transversé subuplicatis, ultimo ventricoso, suturis impressis, umblico mediocri; aperturâ suborbiculari elongatusculâ; labio reflexo, tenui explanato labro acuto.

Axis 1. 3.—Diam. 1. 33.

This shell is nearly related to *H. pomatia*, but has more depressed whorls, and a shorter spire in proportion. The apex inclines more to a point than in *pomatia*. It has not the thickening of the peristome which is so marked in that species.

The colour, sculpture and smaller size also serve to distinguish it. The length of the aperture slightly exceeds the breadth. The colour of the epidermis in the lower whorl is more saturate than in the upper ones.

" Inhabits trees, mossy stones, rocks, crevices, and the earth; common at all times in shady places, particularly abundant at night, early in the morning, and on rainy days. The animal is used by the Chinese in headache, and for bruises. The shell is removed, and the animal applied to the suffering part."

* Dr. Cantor's notes on habitat, locality, uses, &c. are included in the lines with inverted commas.

HELIX TAPEINA, Benson.

Journ. Asiatic Socy. Vol. 5, p. 352, No. 7. This shell was originally described with a collection from the N. E. Frontier of Bengal, in which Chinese forms began to mix with those of our eastern provinces.

" Only two specimens, which occurred on the stem of *Salisburia genko*, were found, at sunrise. The Chinese had no name for the snail, and were evidently not acquainted with it, from which it would appear not to be common."

HELIX NANINOIDES, Benson.

Testa solidiuscula, subdiscoidea, superne radiatim, tenuiter striata, infra striis laevigatis, distantibus. Spirae depresso-conoidea, apice obtusato, planulato; apertura transverse lunata, labro obtuso crasso, infrá subreflexo.

This shell is nearly related to, and is probably one of the terminal species. The want of gloss, observable above, shews that it is not endowed with the lubricating processes which exist on the mantle of *N. vitrinoides*. The under side is somewhat polished.

Dr. Cantor found three shells at different times lying on the ground in his garden at Ting-hae, but never saw it alive, nor did the Chinese know it. It is common at Singapore and Pinang.

CLAUSILIA PLUVIATILIS, Benson.

Testa fusiforme pallide olivacea, spirae attenuata, crystallina apice papillari; anfractibus 14, medianis ventricosioribus, omnibus leviter transverse striatis. Peristome valde reflexo planato, ad basin labii plicata obliqua, solidata, sulcoque concurrente munito.

Axis 1. 1 poll.

This beautiful shell, which is much larger and more narrow in the upper whorls than *C. loxostoma* of our N. E. Frontier, is distinguished by the curious canal which cuts obliquely through the reflected peristome at the base of the inner lip, and which is marginated above by an incrassated prolongation of the lowermost internal plica. The peristome is as broadly and suddenly reflected, as in the Maltese *Cl. labiosa*. In form, it approaches the Dalmatian species *Cl. laevigata*, but it is more ventricose in the lower whorls, and more attenuated in the upper. The delicacy of the oblique striae imparts

a silky lustre to the epidermis. The base of the shell has an oblique keel at the back of the canal on the peristome, as in *Goniostoma*, Swainson (*Bulimus goniostoma*, Sowerby. Zool. Journ. Vol. I.) Swainson has placed *Clausilia* among the *Achatinidae*, and the discovery of this interesting species will go far to prove the propriety of the location. This shell represents the subgenus *Goniostoma* in the neighbouring group of *Bulimus*. Among the *Achatina* proper, it would seem to represent *Achatinella*, in which the emargination at the base of the inner lip is fortified by a thickening of the base of the columella.

This *Clausilia* was only observed after heavy and protracted falls of rain, when Dr. Cantor found at different times three specimens lying on the ground. Eight other specimens were found by digging in the wet earth, where they appeared in company with the smaller *Clausilia aculeus*. The animal is like that of *C. aculus*, and differs only in size, and in being of a greyish black colour.

CLAUSILIA ACULUS, Benson.

Testá subulata nitida, epidermide fuscescenti, anfractibus 10 aut 11, oblique leviter striatis; aperturá dentibus duobus vel tribus munita, peristomate reflexo.

Axis longioris 0.65, minoris 0.5 poll.

There are two sizes of this shell; the dwarf kind appears to be the more abundant. It varies in the presence or absence of the lower plait or tooth, as do some of the European species. Neither of the larger specimens, which I have under inspection shews any trace of it, while in the dwarf variety it is more frequently exhibited than otherwise. The specimens appear to be by no means liable to truncation.

"Lives in the earth, on mossy stones, walls and trees. Appears in great numbers in rainy weather. The Chinese call this species by the same name as *C. pluvialis*."

ACHATINA ERECTA, Benson.

Testá albida, solidiuscula, subulato-turritá, epidermide fœda, scabré, anfractibus octo planulatis, suturis impressis, apice obtuso.

This shell belongs to the same division as, and is closely allied to, our Indian *Bulimus gracilis*, Hutton, and *Bulimus clavulus* of the

West Indies, which Sowerby arranges as an *Achatina*. In all these shells there is a slight evasion or sinuation of the base of the mouth, occasioned by the protrusion of the outer lip ; but in none of them is there the decided truncation of the base of the columella which distinguishes the true *Achatina*. Dr. Cantor's shell approaches most nearly to those forms of *Achatina* which are represented by *A. octona* (subgenus *Macrospira*, Swainson,) but it cannot, notwithstanding its elongated form and oblong aperture, be received into Swainson's subgenus *Leptospira*, by which he makes the transition to *Achatina* from *Bulimus*, with reference to the character assigned by him to the outer lip of *Leptospira* ; and it agrees still less with his figure of *L. signata*, which possesses an exserted aperture with a free border. It is nevertheless not distantly related to *Bulimus decollatus*, which he would place in that sub-genus. In one adult specimen sent, the inner lip and base are considerably thickened by a deposition of shelly matter, added like an anterior lip after the animal had attained its full growth. In its habit of carrying its shell erect, the animal differs from our Indian species, which although it occasionally lifts its shell a little, ordinarily trails it behind.

"Invariably found in company with *Clausilia aculus*. Except in colour, the animals are alike. In habits they differ only in one respect. The *Clausilia* drags the shell along with the apex touching the ground, while the other carries the shell erect on its back. *A. erecta* was also found by Dr. Cantor at Macao, although not accompanied by the *Clausilia*, which he only met with at Chusan.

PLANORBIS PAPYRACEUS, Benson.

Testá compressá, olivaceo-corneá, sub-politá, minutissime radiostriatá, anfractu ultimo latiori, supra infaque æqualiter convexo ; peripheriá carinatá, spirá basique ambabus depresso, umbilicatis ; umbilico inferiori arctiori ; labro superiori valdè prominente, semi-circulari ; inferiori recedente, recto.

Diam, 0.4 poll.

" Found in canals and ponds attached to *Chara* ; not numerous. It is to be observed that the canals at Chusan communicate with the sea (those of Ting-hæ, of course more immediately so,) and although the water is fresh and inhabited by frogs, fresh-water fishes, *Dytiscus*,

Nepa, and covered with *Lemna* and *Chara*, yet it is mixed with salt-water in the vicinity of the sea, which may account for the appearance of marine Crustacea and Testacea."

Whorls 4 in number. This shell seems to take its stand between the depressed *Planorbis* (as *marginatus*, *carinatus*, *spirorbis*, *vortex* etc.) in which the angle of the penultimate volution scarcely enters the mouth of the shell, and the Sylhet species *umbilicalis*,* the English *nitidus*, the Beugal *trochoides*, in which the angle of the penultimate whorl projects far into the cavity of the mouth. In its compressed form it assorts with *carinatus*, while in the character just noted, in the great comparative breadth of the last whorl, and in the somewhat contracted umbilicus, it approaches to *umbilicalis*. The arcuated and nearly semicircular upper lip forms a bow, of which the straight lower lip replaces the chord, and joining on to it at the sharp periphery, gives the mouth a very singular appearance.

In this description, I have considered the shell as dextral. On a former occasion I gave my reasons with reference to the position of the animal in the shell, and Mr. Gray, who quotes my observations, states that Mr. Desmoulins, who has examined the question in detail, concludes that the shell of *Planorbis* is essentially dextral, and that a displacement to the left side of the extremities of certain organs which are themselves on the right side, has led to the erroneous opinion, derived from imperfect anatomical investigation, that the animals were sinistral. Swainson, somewhat strangely seemed to be unaware of this investigation, when he noted that one of the characters of *Planorbis* was a reversed aperture. I have not referred this shell, nor the next, to any of his sub-genera of *Planorbis*. He evidently has not worked them out, nor traced their analogies to the families of the *Phytophaga*. His sub-genera *Planorbis* and *Heli-soma* appear to be scarcely distinguishable by their descriptions, as will appear from the following table, in which I have merely transposed all that Swainson says regarding them, for the sake of the juxta-position of the characters, putting my own observations within brackets.

* Dr. Cantor has lately discovered at Serampore and Barrackpore a new species, belonging to this type of form which is closely allied to *umbilicalis*.

Sub-genus *Planorbis*, Drap.*P. corneus.*

1. Spiral whorls few.
2. Body-whorl ventricose.
3. (Note. This may be said to be the case in *Pl. corneus*, it matters not which side be regarded as containing the apex).

Sub-genus *Helisoma*, Sw.—*H. bi-carinata.*

1. Whorls hardly three.
2. Shell ventricose.
3. The spire sunk below the body-whorl.

I have not Sowerby's Genera to refer to for the type of *Helisoma*, but if it be intended for the reception of forms similar to that next to be described, and which is 'par excellence' of the Heliciform type; and if *Helisoma* be an unclassical abbreviation of the hybrid word *Helicosoma*, in allusion thereto, then the *depression of the spire* must have reference to the depth and construction of the umbilicus on the *really* lower side, and the character "shell ventricose" must refer to the convexity (in the more typical species) of the upper side of the shell. If Swainson should not have intended to characterise this type, I would propose the term *Helicorbis* for it, and would offer the following incomplete sketch of an arrangement. I have omitted *Segmentina*, Fleming; as though its singular internal divisions make it represent the *Cephalopoda*, yet its *form* does not separate it from the subgenus in which *Planorbis nitidus* will be found, and it is not representative, quoad that structure, of any of the families of the tribe to which it belongs.

Families of the Analogies. Subgenera of *Planorbis*.*Phytophaga.*

1. <i>Helicidae.</i>	Typical.	<i>Helicorbis?</i> Benson. <i>H. hemisphaerula</i> , Benson. <i>H. nitida</i> , Gray's Turton Pl. 8, f. 93.
2. <i>Trochidae.</i>	Aberrant. Subtypical.	<i>H. umbilicalis</i> , Journ. As. Soc. 5, p. 741. <i>H. papyraceus</i> , Benson. <i>Trochorbis</i> , Benson. <i>Trochorbis trochooides</i> , J. A. S. 5, p. 742.

3. *Haliotidae* Spire evanescent, *Planorbis*.
 Aperture patulous. *P. corneus*, auct.
P. indicus, Benson. J. A. S.
 5. p. 743.
P. corpulentus, Say. Append.
 to Exped. to St. Peter's
 River. Pl. 15. Fig 9.
4. *Naticidæ*?*
 5. *Turbinidæ*. Aperture rounded, *Omalodiscus*, Benson.
 not encroached (\dagger *Spirorbis*, Swainson.)
 upon by the pre-
 vious whorl.
O. marginatus, *Spirorbis al-*
bus, &c.

PLANORBIS HEMISPHERULA, Benson.

Testâ nitidâ, olivaceo-corneâ, supra convexâ, apice planulatâ, infra excavatâ, umbilico coarctato ; peripheriâ obtusâ, nullo modo carinatâ.

Diam. 0.25 poll.

This species, belonging to the circle of *Helicorbis*, is nearly related to the Sylhet *umbilicalis*, but differs in colour, in its greater convexity and narrower umbilicus. The periphery is rounded, not angulate ; the spire has no depression below the surface of any of the whorls, while the underside is concave. I have another species of the subgenus in which the umbilicus is as narrow as in *Trochorbis*, none of the previous whorls being visible. It will form the passage from *Helicorbis* to that sub-genus ; it is from the Indus at Sukker, is very minute, and was accidentally sent to me, secured from injury in the hardened mud which filled the aperture of a *Paludina bengalensis*, picked up with other well known shells of the provinces by a friend, on the bank of that river.

" *P. hemisphærula* is found in the same localities as *P. papyraceus*, on *Chara*, *Lemna*, &c. It is not numerous."

* Is this family a fair representative of the *Cypridæ* among the *Zoophaga*?

† This name having long been pre-occupied by a genus of *Annelides*, Swainson's subgenus requires a change of designation. Swainson has also called a genus of the *Olivinæ* "*Scaphula*" without observing that in 1834, I applied the name to a fluviatile form among the *Arcadæ*. Zool. Journ. vol. v.

LIMNAEA PLICATULA, Benson.

Testâ elongato ovatâ, corneâ scabriusculâ, anfractu ultimo transversé plicatulâ, suturis impressis; spirâ mediocri, apice acuto plerumque ferrugineo; aperturâ infra patulante, basi evasâ.

This shell differs scarcely in shape from a *Limnaea* (*L. miscella*, nobis) common in the Rivers of Rohilkund and in the River Goomty, which approaches in some of its characters very nearly to one of the varieties of *L. chlamys*. The present species may be distinguished from *L. miscella* by the want of polish, by the more deeply impressed sutures, by the slight plications on the last whorl, and by its coloured apex.

"Found in fresh water ponds, floating on the surface, or attached to *Chara*. *L. plicatula* is common."

LIMNAEA MINOR, Benson.

Testâ ovato-acutâ, cornea, politâ, spirâ vix dimidium testæ efformante; apice obtusiusculo, anfractibus quatuor, suturis leviter impressis; apertura ovatâ, plicâ columellæ obsoletâ.

This very distinct shell was among the specimens of the last described species. The specimen under review is a small shell, and intermediate in form between the English *L. fossaria* (*minuta*, Lam. *truncatula*, Gray) and the large species of our Western Provinces, *L. bulla*, which again is nearly allied to the Bengal species *L. luteola* of Lamarck. From *L. bulla* it differs in its comparatively greater length of spire; from *L. fossaria* by the shorter spire and slightly excavated sutures.

BULLÆA CAURINA, Benson.

Testâ ovato-oblonga, albâ, tenuissimâ, papyraceâ, transversé eleganter minutissimeque striatulâ; aperturâ auriformi supra angustatâ, infra patulante; labro apicem superante; spirâ nullâ.

The part of the body-whorl which is visible when the aperture is turned towards the observer, is small in proportion to the mouth. The summit of the shell resembles the same part in *Bulla navium* and *B. solida*, but the outer lip is destitute of the fold where it rises above the apex, which appears in those species; resembling, in this respect *B. ampulla*. The thinness of the inner lip locates this shell in *Bullæa*. Its being internal, probably accounts for the state of

Dr. Cantor's specimens from the contraction of the cooked animals, compressing the very fragile shells. The same circumstance may have occasioned the want of success met with in the search for living examples.

"On entering a house in Tinghae, where the people had just finished their breakfast, Dr. Cantor observed a number of these shells (broken with but one exception,) on a dish. To an enquiry whence they came, the Chinamen asserted, that they were taken in the canal. Although Dr. C. offered a reward and almost daily dragged the canals, he was never able to procure another specimen. The same dish contained shells of *Paludina quadrata*, which is a favourite food of the Chinese, and is plentiful in all the canals, even close to the sea; and as the canals communicate with the sea, the *Bullæa* might possibly have been found in the locality assigned."

PALUDINA QUADRATA, Benson.

Testa elongato-conoideâ, crassa, epidermide viridi-olivaceo, anfractibus sex planulatis, leviter transverse plicatis, longitudinaliter liratis; liris subquinis, aperturâ mediocri, intus albido-violacea; umbilico arcto, peritremate nigrescente.

The slightly prominent longitudinal ridges (which, with the flattening of the whorls, contribute to give the shell a singular appearance,) vary much in number, and in some specimens are nearly obsolete. The operculum is horny. The shell in its thickness and sculpture indicates an approach to the *Melanianæ*, but the animal having the eyes on an exserted pedicle, differs therein from *Melania* in which the eye is sessile on the tentaculum. It also differs from the ordinary forms of *Paludina*, in which the eye-supports seem to occupy a common tube with the tentaculum, and to be truncated at the point of divergence. The ridges of the shell are frequently invested with either a vegetable or a spongeous growth, which gives it an appearance of having variegated bands, which do not properly belong to the epidermis.

"Extremely common in canals and fresh-water ponds, where it is found in the mud, and adhering to stones, wood, aquatic plants or any firm object which may happen to be immerged. The specimens vary in size; larger specimens were observed, than the one figured.

In the female, Dr. Cantor found from 7 to 10 young ones of different sizes. This species forms a common and favourite article of food with the Chinese, and large supplies were exposed for sale in the market at Tinghae."

PALUDINA LECYTHOIDES, Benson.

Testâ ovato-acutâ, olivaceâ; anfractibus sex aut septem rotundatis, transversé subuplicatis; suturis excavatis; aperturâ oblongâ; peristome subreflexo, nigro; apice acuto; umbilico ætate evanescente.

Nearly allied to Gray's *P. chinensis*, and to *Paludina lecythes* nobis (Journ. As. Soc. Vol. V. page 745). It differs from the latter in its more produced form, more acute apex, the slighter convexity of the whorls, and its greater solidity. From *P. chinensis*, which has an eroded apex in the specimen figured, and which it resembles in habit, it differs in the absence of any angularity at the base of the aperture, which is also less oblique in the shell under review. In young specimens the olive-coloured epidermis has a lutescent tinge, and dark stripes accompany the plicæ of growth. The colours are darker in adults, and in one variety, the lower portion of the last whorl is ornamented by a series of light coloured longitudinal bands. In the very young shell, the aperture equals the spire in length; the spire is conoidal, and the peritreme of the last whorl, angular and subcarinate. The same characters are observable in the embryo, but the apex, in the latter state, is produced in a papillary form.

"Lives in the mud in ditches and fresh-water ponds. Not numerous. The snail, when once removed from its native element, keeps itself shut up, although confined in water. It is a favourite food with the Chinese, who eat it prepared in the same manner as other edible snails, viz. boiled. The embryos, which vary from 8 to 12, are somewhat larger than those of *P. quadrata*, and their shells are colourless and semitransparent, whereas the embryo of the latter is frequently of a dark colour."

PALUDINA (BITHINIA, Gray) LONGICORNIS, Benson.

Testâ ovato-conoideâ, corneâ, politâ, spirâ aperturam longitudine vix superante; anfractibus quatuor, ultimo convexo, suturis minimè depresso; aperturâ subrotundâ, supra angulatâ; peristome subre-

flexo, nigrescente; labio crassissimo; operculo testaceo; umbilico evanido; apice obtuso.

This shell appertains to the group of small *Paludinæ* which Gray has separated under the designation of *Bithinia*, to which belong the English *P. impura*, the Indian species *cerameopoma* and *pulchella*, (*nobilis*), *goniostoma* (Hutton) and one or two other species, inhabiting the rivers and pools of the gangetic plains, which as yet are undescribed. The present species is remarkable for the thickening of the inner lip in the part where it adheres to the penultimate whorl.

"Found in the canals in great numbers, attached to aquatic plants, stones, piles, &c."

PALUDINA (BITHINIA) STRIATULA, Benson.

Testâ orato-acutâ, corneâ, politâ; spirâ elongatâ; anfractibus quinque convexiusculis, liris pluribus, interdum inconspicuis, circumdatis, suturis depressiusculis; apice obtusato. Peristome reflexo, nigrescente, undato; umbilico evanido; operculo calcareo.

This form is singular among the *Bithinia* on account of the ridges on the whorls. All the other known species, including those above named, viz. *parvula* of the West Indies, *rudis* and *rubens* of Dalmatia, *fluminensis* of Hungary, *inflata* of the Ionian Islands, and a small Sicilian species which stands in my collection without a name, being deficient in sculpture. The number and degree of prominence of the ridges vary much, and they diminish in prominence in proportion to their paucity.

"Less common than *P. longicornis*, but found in the same localities. The animals and their habits are similar."

MELANIA CANCELLOATA, Benson.

Testâ elongato-turritâ, olivaceâ solidiusculâ; anfractibus novem convexiusculis, omnibus costulis frequentibus, ultimoque fasciis tribus elevatis basalibus munitis; costulis liris plurimis cancellatis; suturis mediocriter excavatis; apice eroso.

Axis 1.0 poll. vel paulô plus.

This little species is nearly allied to the gigantic, *M. variabilis*, (*nobilis*), of Bengal, and like it, has the sinuated aperture, which indicates the approach of the genus to the neighbouring type: *Mela-*

nopsis. There are seldom more than seven whorls present, the apex being subject to decollation, which in this genus, I have observed to be an indication of residence in stagnant water.

"Nearly all adult specimens somewhat mutilated. Found in the canals close to the sea in the mud, and makes its appearance in the market, not as an article of food, but in company with the fish caught by dragging the bottom of the canals."

MELANIA (HEMISINUS? Swainson) CREBRICOSTIS, Benson.

Testâ elongato-turrita, olivaceâ, tenui, anfractibus plurimis leviter convexis; costis frequentissimis albidis, laevigatis munitis, ultimo costulis evanidis; balteo submediano, rugisque plurimis basalibus circumdato; suturis impressis; columellâ subrectâ; basi leviter canaliculato-effusâ; labro tenui, lævi, sub-reflexo; apice decollato. Axis testæ decollatæ 1.05 poll.

This is a very interesting shell, agreeing nearly with Swainson's subgenus *Hemisinus*, the type of which is figured in Griffith's Cuvier as *Melania lineota* (Vol. XII. Pl. 13, fig. 4). The Chusan shell however, shews no symptom of the crenation in the aperture, which is attributed to the type. The species now described leads to the sub-genus *Cerithidea*.

"Found among specimens of *Melania cancellata*."

BATILLARIA,* Nov. Gen.

Testâ turrita, insculptâ, rudi; anfractibus plurimis, aperturâ oblongâ, infrâ angustiore, basi truncatâ, evasâ; labro sinuatâ, suprâ emarginato, infrâ proiecto; labio suprâ callo munito; columellâ planatâ, basi incrassatâ, oblique truncatâ, canalem vix efformante; operculo corneo, tenui, spirali, multiverticillato.

BATILLARIA ZONALIS, Benson.

Testâ elongato-turritâ, scabré, albidiâ, fasciis fuscis ornatâ; anfractibus tredecim mediocriter convexis, costulis liris longitudinalibus decussatis, supra sub-nodulosis; apertura intus fasciis fuscis strigatâ; columellâ albâ. Axis 1.4 poll.

SYN. *Cerithium zonale*, Lam. L'océan des Antilles.

C. zonale, Gray, Griff. Cuv. 12, Pl. 14, fig. 1; China?

* *Batilla*, a shovel; from the lengthened form of the shell, and the conformation of the base of the aperture.

"From the coast of Chusan. Some were brought to Dr. Cantor from the entrance of the canal; but he did not himself find them in the estuary."

This shell does not agree with the characters of any of the subgenera of *Cerithium* in which Lamark and Gray have placed it, and the structure of the base of the columella is almost precisely that of *Planaxis*, Lamarck, from which the form is sufficiently distinguished by the truncation of the base of the aperture, its sinuous outline, and the absence of the interior ribs, as well as by the elongated form of the spire. Swainson has considered *Planaxis* to be a terminal genus of the *Melanianæ*, and the present species in its form and sinuous lip presents characters in consonance with the typical species of *Melania*, while the columella approaches to the structure of that of *Melanopsis*. As in *Planaxis* and many of the *Cerithina*, there is a callus attached to the penultimate whorl near the top of the aperture, and its scabrous surface and occasional disposition to form a varix on the last whorl behind the pillar, give a farther resemblance to that sub-family.

LAGUNCULA, Nov. Gen.

Testâ turbinatâ, subglobosâ, aperturâ majori, integrâ, oblongâ, peristome interrupto, labio subreflexo; umbilico profundo, tortuoso.

LAGUNCULA PULCHELLA, Benson.

Testâ albido-glaucâ, ovato-globosâ; anfractibus convexis, lineis longitudinalibus, elevati scutulis, aliis obliquis decussatis, instructis; suturis impressis; aperturâ intus fasciâ latâ pallidé-castaneâ ornatâ, columellâque intus concolori.

"Asserted to be an inhabitant of the canals at Chusan, and found under the same circumstances as *Venus chinensis*."

The raised lines crossing each other, give the facet-like appearance to the surface, which is frequently observable in *Limnaea*. The form of the umbilicus and the greater prominence of the raised lines near the umbilicus shew an approach to the subgenus *Globularia*. Whorls 5, exclusive of the apex, which is less acute than in *Assiminia*. The substance of the shell is thin, and it has much the aspect of a shortened *Paludina*, such as *P. crassa*. It appears

to be related both to *Assiminia* in the *Turbinidæ*, and to *Lacuna* and *Globularia* in the *Naticidæ*. From the former it is distinguished by its more globular form, and by the openness of the umbilicus, as well as by the absence of any distinct shelly plate, adhering to the body-whorl, within the aperture. From *Lacuna* it may be known by the circumstance of the umbilicus being situated about the centre of the aperture, instead of near its summit, and by the same absence of a shelly plate. From *Globularia* it is distinguished by its more lengthened form, less concave inner lip, and by the absence of a thickened belt at the base of the body whorl.

MYTILUS NIGER, Benson.

Testâ oblongâ, trigonâ; cardine unidentato; natibus subincurvatis, decorticatis, sub epidermide albis, marginibus purpurascensibus; intus margaritaceo-splendidâ, margine purpureo. Long. 3.4 poll. Lat. 1.7.

It is punctuate in the interior, especially near the beaks. There are *Flustra* on all the specimens, leading to the supposition, notwithstanding their nacre, that the habitat is marine.

DREISSENA PURPURASCENS, Benson.

Testâ oblongâ sub-quadratâ, radiato-plicatâ, sub epidermide albo purpureo que ornatâ, intus margaritacea, epidermide brunneo, apice subincurvato, compressiusculo. Long. 1.5, Lat. 0.8 poll.

The anterior margin is minutely toothed. The posterior muscular impression is curiously honey-combed, and the whole of the interior is strongly punctuate at nearly equidistant points. The plicæ or raised striæ are strong within a short distance of the beaks and along the anterior side of the umbonal slope, but become obsolete on the rest of the shell. The epidermis is seaceous and covered with a minute weed, which looks like a fresh-water production. The septum at the beaks refers this shell to *Dreissena* of Van Beneden, which includes the fluvial species *polymorpha* of Europe.

"Dr. Cantor never saw those muscles alive, but found the empty shells about the houses at Tinghae. The Chinese said that they were found in great numbers in the canals close to the sea, but only in winter, when large supplies are brought to market. They also asserted that they attain upwards of six inches in length."

MODIOLA SENHOUSIA, Benson.

Testâ transversé oblongâ, subalatâ, gibbâ, læviusculâ; anticé angustatâ; intus iridescente; epidermide olivaceâ, obscuré radiatâ; alâ natibusque strigis flexuosis spadiceis ornatis, basi leviter emarginatâ. Long. 1.2, Lat. 0.6 poll.

Named by Dr. Cantor after the late Sir H. Le Fleming Senhouse, who first observed it and pointed it out to him. This gallant officer who commanded the naval forces in the attack on the city of Canton which resulted in its submission to the British arms, and who fell shortly afterwards a victim to his exertions in that engagement, was much attached to Natural History.

“Sir H. Le Fleming Senhouse observed numbers of this shell on board of one of the captured junks, where specimens were obtained from the Chinamen, who had brought a large supply, preserved in salt, from the east coast of Canton Province. Dr. Cantor afterwards found two specimens on the mud among the fragments of rocks which line the coast of Chusan. People at Tinghae were well acquainted with the muscle. Judging from the heaps of shells which lie about every house at Chusan, the people are great consumers of shell fish, and it is amusing to see how expert they are in opening bivalves, for which their inch-long nails are well adapted. Dr. Cantor later observed this shell inhabiting the shores of the Malayan Peninsula, Singapore and Pinang.”—

The form belongs to the subgenus *Brachydontes* of Swainson. A nearly allied, but much smaller, species occurs in the Creeks of the Sunderbuns, which I propose to describe as *M. variegata*.

ANODON GIBBUM, Benson.

Testâ fragili, ovatâ, tumidâ, antice rotundatâ, postice subalatâ, supra angulatâ, extremitate posticâ subangulatâ, natibus concentricé rugosis, rugis parallelis, subdistantibus, areâ posticâ radiis tribus approximatis, leviter elevatis, rugosisque, munitâ; margaritâ interius albida versus apicem aurantio-tabescenti, versus marginem purpureo-viridique splendide margaritacea; margine fusco; epidermide olivaceâ, obscure radiatâ. Long. 2.0, Lat. 3.2 poll.

This shell approaches in form and outward appearance so nearly

to one of the varieties of *A. cygneum*, that at first sight, it might be difficult to distinguish them; but on opening the valves, the superior splendour and vivid colouring of the Chinese shell at once suggest a specific difference. *A. cygneum* shews vestiges of raised rays, similar to the three on the surface of *A. gibbum*, but in an English specimen, of the variety *incrassatum*, does not present the concentric rugæ on the beaks, which are exhibited by Irish specimens of another variety, in which however, they are closer and more delicate than in the Chusan shell. The sub-cardinal muscular impressions are more immediately under the beaks in *A. gibbum*, while in the British species they are more removed towards the anterior side.

"Sometimes 5 inches in length. Very common in mud in the canals. Sold in the bazaars as an article of food. Large specimens are very brittle, and precaution should be taken to dry them in the shade."

UNIO (THELIDERMA, Swainson,) LEAI, Gray.

Testâ crassâ, subovatâ, alatâ, compressâ, umbonibus dentibusque cardinalibus extremitati anticæ angustiori approximatis; valva sinistra dente cardinali interiori marginaque cardinali pene parallelis; illa versus dentem lateralem medioriter productam spectante; valvâ dextrâ dente cardinali unicâ crenatâ; valvis intus minime profundis; margaritâ iridescente, pallide salmonis colore tinetâ; natibus minimè prominentibus; rugis seriebus duabus e lineâ umbonali divaricatis; posterioribus simplicibus, anterioribus, basalibusque nodulosis, testam exteriorem munientibus, epidermide flavo-olivaceâ. Length 2 inches, breadth 3, weight of the two valves $1\frac{1}{2}$ oz.

The interior lobe of the cardinal tooth in the left valve is in a line with the lateral tooth, or nearly so. The anterior impression of the adductor muscle is finely sculptured in a radiate crystalliform manner. The epidermis is slight yellowish olive, verging into light brown. The posterior margin is sinuous, owing to the ends of the nodulous radiating ribs, which diverge in 2 curved series from the umbonal slope: those towards the posterior margin and wing being simple, while those which run towards the basal and anterior margin, consist of a series of nodules. The two smaller muscular impres-

sions of the cardinal group are in this species situated transversely, one of them being remote from the large impression, but in *U. divergens*, one is situated above the other, and both adjoin the large impression.

This shell is evidently the same species as that figured by Gray in Griffith's Cuvier, Vol. XII. Pl. 21, fig. 1, but without a description. The aspect of the shell, and still more that of *U. divergens*, reminds the observer of the thick nodulous forms which inhabit the waters of North America, and is quite unlike that of any of our Indian species, only one of which attains any moderate degree of thickness.

"A perfect specimen of this and a single (left) valve of the next species were found in a house at Tinghae. They are eaten by the inhabitants, who asserted that the shell is found in fresh-water somewhere on the Island. At Macao, Dr. Cantor afterwards saw a specimen with a gentleman who had received it from a native of Canton. The latter asserted that the shell inhabited the mud in the Canton river, at some distance in the interior."

UNIO THELIDERMA, Sw.) DIVERGENS, Benson.

Testa crassâ, angulato-ovatâ, subalatâ, tumidiusculâ, facie externa tuberculato-plicatâ, rugis seriebus duobus e lineâ umbonali divaricantibus; posterioribus simplicioribus, anterioribus basalibusque plerumque nodulosis; natibus mediocriter prominentibus, epidermide nigrescente, striis subimbricatis. Valvæ sinistræ dente cardinali interiori versus angulum marginis posterioris basalisque spectante, ad latus exterius laminis pluribus munito; dente exteriori pene obsoleto brevi, a basi interioris divaricato; dente laterali brevi crasso. Long. 2.65, Lat. 3.5 poll.

The lateral tooth is nearly parallel with the direction of the inner cardinal tooth, instead of forming, as it were a prolongation of the same line, as in the last species. The anterior impression of the adductor muscle is irregularly reticulate. Anterior margin sinuous, from the protrusion of the extremities of the rugæ. Weight of a single valve $2\frac{1}{2}$ oz. nearly. It is not very distantly related to the American species *U. costatus*, Rafinesque (*undulatus*, Barnes) figured in Conrad's Monograph in plate No. 17.

CORBICULA FUSCUTA, (Lamarck.)

Testā cordatā subinæquilaterali fuscovirente, tumidiusculā, politā, intus et ad nates violaceā, extrinsecus sulcis crebris circumdataā, rugis intersitis subimbricatis; margine interiori plerumque nigrescente; natibus decorticatis. Lat. 1.3, Long. 1.15 poll.

This appears to be *Cyrena fuscata* of Lamarck, belonging to the division which Megerle has separated under the name of *Corbicula*, and which is well distinguished with reference to the minutely serrated and elongated laminar lateral teeth. The plica on the outside of the valves are more distant than in our Indian species.

“Found in the mud in the canals; sold in the market.”

VENUS SINENSIS, Auctorum.

Testā orbiculatā, convexā, albida, marginibus violaceis denticulatis, extrinsecus radiis violaceis plicisque concentricis exilissimis ornata; disco plerumque ferrugineo; dente cardinali postico, bifido saepe bilobato, lamina cardinalis extremitate posticâ concavatâ. Long. 1.7, Lat. 1.65.

Icon. Wood, Pl. 8, fig. 76, non bene.

In most specimens, the coloured rays are confined to the posterior half of the shell; but occasionally, they pervade the whole disk, and decussate the concentric plaits in such a manner, as to deceive the eye, and to cause the belief that there is a radiate striate sculpture. The siphonal scar cuts sharply through the sub-marginal impression, and ends in a point near the centre of the shell, as in *Artemis linota*, and, in a less degree in *Venus gallina*.

“Dr. Cantor never saw this bivalve alive, but judging from the number of shells lying about houses at Chusan, it must be a common article of food. According to the Chinese, it is an inhabitant of the canals.”

SANGUINOLARIA IRIDESCENTS, Benson.

Testā subelliptica, compressā, albida, iridescente, versus apicem incarnatā, exilissime transversè striatā, striis obsoletis radiatim decussata; latere postico subrostrato, subangulato, antico longiore, rotundato.

This shell has a chatoyant reflection on the exterior of the valves, of which the substance is not in the least degree pearly. The rostrated end exhibits a faint trace of the fold which characterizes the *Tellinæ*.

"Found under the same circumstances as the last, and asserted to be an inhabitant of the canals."

ARCA GALACTODES, Benson.

Testâ subrhomboideâ, tumidâ, subæquilaterali, anticé subangulatâ, posticé rotundatâ, multiradiata; radiis exilissimis auctâ, rugis decussantibus; cardine mediocri, terminis exterioribus angulatis; natibus lævibus remotiusculis, incurvatis; margine lævi; epidermide fuscâ. Lat. 0.75, Long. 0.5, poll.

This shell belongs to the sub-division of *Arca*, which contains the English marine species *A. lactea* and the Crag fossil *A. lactanea*,* Wood. It is sufficiently distinguished from both by its tumid form; its greater length from beak to base, in comparison with its breadth, by the shortness of its cardinal line, and its more equilateral form. As in those species, the teeth are vertical at the centre of the hinge line, and inclined or radiate at the extremities. The lozenge-shaped space between the beaks is occupied by numerous raised lines, vertical to the hinge line, which are crossed again by faint depressed lines, affording a firmer hold to the ligament and performing the same office as the angulate concentric channels or scorings in *Byssocardia*.

"Found under the same circumstances as the last, and equally asserted by the Chinese to be an inhabitant of the canals."

NOVACULINA CONSTRICTA, (Lamarck.)

Testâ albâ, tenui, transversè oblongâ, læviusculâ, extremitatibus rotundatis, radio mediano subconstrictâ; epidermide olivaceo-flavescente, postice quasi capillis intertextis adhærentibus vestitâ. Lat. 2.45, Long. 0.75, poll.

Solen constrictus, Lamarck, Vol. 5, p. 455.

This shell, which Lamarck has described as *Solen constrictus*, and which, on the authority of Péron, he considered to be from the Chinese or Japanese seas, appears to have been a specimen of this

* Mag. Nat. Hist. Vol. IV. N. S. P. 232, Pl. Supp. No. 13, f. 3.

shell, deprived of its epidermis. The terms in which Lamarck mentions its habitat, and the doubt whether it belonged to China or Japan, may well account for his describing it as a sea-shell. He places it immediately after the British marine species *Solen antiquatus*, which approaches *Novaculina* in form and in its exserted medial beaks, though it differs in the number of the teeth. From *Novaculina gangetica*,* (nobilis), to which it bears a near resemblance, it is well distinguished by the radiate depression which runs from the apex to the base of the shell, and which bears an appearance, as if a string had been tightly tied obliquely round the closed valves when in a soft state.

Novaculina now numbers five species, two of them American, two Chinese, viz. *constricta* and *acutidens* (Sowerby, Broderip, Zool. Jour. Vol. IV. p. 361), and the Indian *gangetica*, the species on which the genus was originally founded. Swainson has adopted it as a sub-genus of *Solen*. Gray's *Solen novaculina* (Griff. Cuvier, Vol. 12, Pl. 31, fig. 1.) appears to represent an individual of *gangetica*, of which the teeth were injured. A dwarf variety of the latter shell occurs in the mud of the aqueducts in Calcutta.

"*Novaculina constricta* was picked up among a number of other shells, thrown in a heap outside the kitchen door at the house of the first civil Mandarin of Ting-hae."

With reference to the foregoing descriptions, it is interesting to observe that several forms are absent which might have been expected to occur in the latitude of Chusan. Among the land Testacea, independently of the true *Limaces*, we may notice the want of *Pupa*, *Vertigo*, *Carychium* and *Cyclostoma* which are met with in the temperate and warmer regions of Western Asia among rocks and under stones. We miss the more ventricose forms of *Bulimus* as well as of the genus *Achatina*. *Succinea* is also wanting, but occurs abundantly farther south, at Macao. Among the fresh water genera we miss *Ampullaria*, *Neritina* and *Navicella*, and among the Acephala, the genus *Psidium*.

MORADABAD, December 29th, 1841.

* Gleanings in Science, Vol. 2, p. 63, 1830, and Pl. V. fig. 4, vol. I. and Sowerby's Manual, fig. 63.

A brief Notice of the Subháshita Ratna Nidhi of Saskya Pandita, with extracts and translations by the late M. A. Csoma de Körösi.

The following paper was written so far back as 1833, and would have been published in continuation of the series which appeared in the earlier Numbers of this Journal, had not the death of the writer thrown difficulties in the way of bringing out the Tibetan text. These difficulties have been removed through the kind assistance of Dr. Campbell of Darjiling, who has had the proofs corrected by Lama Aden Cheboo at that station, who had studied the Buddhist religion and Tibetan literature at the monastery of Menduling in Thibet.

Cs. de Körösi refers to leaf 23, page 44 of the Index of the Kah-gyar, which collection he had previously noticed in Vol. II. of the Journal.—ED.

This work was composed by the celebrated “Sa-skyā Pandita” (called in Tibetan, སྤକ୍ଷା ༜ୀବନ ༚ରିତ୍ରାଣି ༑ ଧ୍ୟାନ ଯତନ ༑ K'un dgah rgyal-mts'han dpal bzang-po; in Sanskrit, Ananda Dwaja Shri Bhadra), who flourished in the 13th century, in the time of Ginghis-khan and his successors. He resided in the Saskya monastery (a Convent, in Middle Tibet, in the province of Ts'ang, one hundred days' journey distant from Teshi Lungpo (ତେଶି ଲୁଙ୍ପୋ). That Great Lama (called: “hP'hags-pa hGro mGon” གྷହ୍ଵାଗାସ ༑ ག୍ରୋ ༑ ༢ାଙ୍କ ༑) to whom Kublai-khan (the emperor of China, of the Mongol dynasty, in the last half of the 13th century) had granted the whole Middle Tibet (or U-tsang) was the nephew (or a brother's son) of this learned Pandita. Their descendants possess now also the above mentioned Monastery (with some small appurtenances) and are next in dignity after the two great Lamas of Lassa and Teshi Lungpo. The Sa-skyā Monastery (or Couvent) is one of those places in Tibet, (ଏଥିରେ) where many Sanskrit books (taken or transported from India) may be found now also.

कृत्ति श्री तुथा पर्यं शैदायर्दन कृति देव यामतरै निमल श्री शैदाय &c.

- 1 दर्शक अकारा या शुभा य । ददायना
- 2 दमाक्तसा यश्च या य । ददायना ।
- 3 घेंक अकार अकार यसु या ।
- 4 या अर्था यसु द शैदाय ।
- 5 ग्रीष्मा अवृत्याद अकाय द शैदाय ।
- 6 अर्हद यशेषा या शुद्धयवद ।
- 7 अथाक्षी या यकार द यसु ।
- 8 अद्य इद य ।
- 9 अमीरा या यसा या शैदाय ।
- 10 वस्त्रकोटि याशैदाय शेषा ।
- 11 दक्ष अकार अकार य द यसु ।

To the Ten* moral precepts to be added the following Articles ordered by "Srong-b,tsán," a religious king (of Tibet) (Dharma Raja) (or an Apostolic king, or a defender of the faith).

1. Reverence to God. This is one, (or this is the first).
2. Exercise of true religions. This is the second, &c.
3. Respect for the Learned.
4. To pay honour to his parents.
5. To show respect to the high class, (or to those of rank and quality) and to old men.
6. Good-heartedness (or sincerity) to a friend and acquaintance.
7. To be useful to his country-fellow.
8. Equity (or impartiality, or righteousness).
9. To look on (or imitate) good (or excellent) men.
10. To know how to enjoy meat and wealth. .
11. To return a kindness received (before).

* The Ten moral precepts are : 1, Not to kill. 2, Not to steal. 3, Not to commit adultery. 4, Not to tell falsehood. 5, Not to abuse (with his language). 6, Not to speak nonsense. 7, Not to slander. 8, Not to be covetous. 9, Not to have a malicious mind. 10, Not to be stubborn in a wrong principle.

- 12 शे. शद् था शर्यै. शुभेद् य ।
 13 शै. श्वेभव् विद् शुषा. दैष मीदय ।
 14 शुद् मेद् श्री. डाथा. मी. वक्त्य ।
 15 दण् रूपम् विद् शृं बाक्षय ।
 16 द्वैष् पाल्हि. देव् शृं त्रैष् अदस्य ।

੫੮· ਯਤ੍ਨੁ ਇਥਾ ਸ਼੍ਵੰ॥

ଶେଷାଧିପତି ଯମର୍ଦ୍ଦି ଟିକିପୋକେଇ ଶନ୍ତି ଲିଖିଛି ଗର୍ଭାସୁଧାରେ ଯଜ୍ଞକ ଯଠନା
 ରିଦ୍ୟାଶାଧି ରହମାନ୍ୟତା ଅନେକ କ୍ଷତି ଶୁଦ୍ଧି ଥାଏ ଶୁଦ୍ଧି ରକ୍ତଥାରେ ॥
 ଜୀବି ମହାଦେଵ ଶୁଦ୍ଧିଧା ଶୁଦ୍ଧିଧା ଟିକିଶା ରହିବାକିଣୀ ।
 ହଦ ଶେଷଦ ତୁଳାଧି ଶେଷାମନାଟି ଯାଦି ଶଦମୀଷ ଶେଷାଲା ।
 ଶୁଦ୍ଧିକର୍ମ ଦଶରଥି ଶର୍କରାଶେଷ କେନ୍ଦ୍ରିୟ ବ୍ୟାନ ବକ୍ତରଧି ।
 ରଷେ ଯରୀ ଶତ୍ରୁଧି ଶୁଦ୍ଧ ମହେଶ ଦେଖା ଯବନ ଶୁଦ୍ଧିରକ୍ତଥ
 ଟିକିଶା ଯଶ୍ଚଦ୍ୟନକ କେନ୍ଦ୍ର ଶୁଦ୍ଧିନ ମୀର ରଷଥନିନ ।
 ରହିଶିର୍କିଶ ପୁରୁଷ ଶୁଦ୍ଧି ଶୁଦ୍ଧିଶାଶ ଶୁଦ୍ଧିଧା ।

12. To avoid fraud in measures and weights.
 13. To be, in general, impartial, and without envy.
 14. Not to listen to the mouth (advice) of a woman.
 15. To be affable in speaking, and prudent in his discourse.
 16. To be of high principles, and of a generous mind. And

these are the 16 (Articles).

Subháshita Ratna Nidhi náma Shástra is the title of the work in Sanskrit.

Salutation to Manju Srí.

The presentation of sacrificial offerings to the All-knowing, the Sovereign of men. What is to be understood by "*A Treasury of Elegant Sayings*" or, in a literal translation: A Precious Treasure of Elegant Sayings, i. e. a Literary Work. Reverence be to "h,P'hags-pa h,jam-d,pal" the juvenile form of the god of wisdom. (S. A'rya Mañju Srí kumár Bhuta.) After having presented my oblations of the most precious things, taken from the religious instructions of the chief of the gods (Shákya) from Nágarjuna, the prince of logicians;

द्वयाद्य ज्ञेन्या श्रीं शृङ्करां त्वं एति रुद्धं निष ।

यमद्याद्वद्यन्ते रोषस्यायमद्यर्त्तकं एते ॥

1 रुद्याद्यकद्यएति रुद्याद्य श्वसन ।

कं रुद्याद्य मात्रस्याद्य मीर्त्तिं शुद्ध ।

श्रीं य श्रीं मट्ट यदेत्यायार्थ ।

केऽप्याद्य रुद्धं ज्ञेन्या एति याद्वद्य ।

2 अर्काद्य भूकाद्य श्रीं य शुक्र ।

मायम्बुद्ध्याद्य यद्याद्य रुद्धं रुद्ध ।

क्रीं भूकामी देवा तुद्याद्य यद्य ।

शुद्धाय श्रीं क्षीर्त्ति क्षीर्त्ति एवा यरेका रुद्ध ॥

3 मात्रस्याद्य अर्णाद्य द्यप्ता मेद्युद्ध ।

अनश्चृणु अर्काद्य तुद्याद्य एति ।

द्युद्ध श्रुकाद्य शुद्धाय यरेका ।

शुद्धाद्य इमन्या रुद्धं मात्रस्याद्य रुद्ध ॥

from Vyása, Válmiki, Akshapáda, &c., I adore the Sovereign of men, the All-knowing. The exhibition of judicious reflexions upon all sorts of worldly affairs, and upon the conduct of the virtuous (holy or excellent) men, without offending (in all these) against good morals, is called “*A Precious Treasure of Elegant Sayings.*”

I. REFLECTION ON THE WISE. (मात्रस्याद्य यरेकाद्य).

NOTE.—The word यरेकाद्य (critical investigation) is added, in the text, to the subject of each chapter, but, in this extract, it will be left out.—See the Tibetan Text.

1. Were you to die the next year, acquire science: though in this life you cannot become wise, in your future birth, it will be a commendatory precious thing, if taken with you.

2. If you are a talented man, every one gathers round about you, without being called; a scented flower, though it be at a far distance, is surrounded with a cloud of swarming wasps.

3. A wise man, though possessed of immense perfections, will learn from others; and by such continual practice, he will at last arrive at omniscience.

4 मात्स्याप्य शेषाद्य शैवा शुद्धका ।

द्विष्यं भद्रपदं शाश्वतं तुष्टिष्ठा ।

द्वथमस्या शैवाश्चैर्क्षमावैर्यु ।

शंखाम्बुज्या द्विष्ये क्षेष्णाशुका ।

5 द्वयू रघुदस्य यस्तद्व कमस्य यस्तमस्य धरीमी ।

शंखाम्बुज्या येन्द्रायदं शुकाश्वा शैवा ।

त्रिं द्विष्ठस्य शैवायें सेदं शोददा ।

द्वार्ता शेष्या शुक्राश्वा शेष्णामी द्विष्ठस्या ॥

6 विष्णवा था मात्स्या का क्लेश्येयदा ।

शक्तिं यसेष्या परा शाश्वा द्विष्य ।

मात्स्या श्वेतं शुक्रं शैवा क्षेष्णायदा ।

शेष्या शुक्रांश्चक्षिप्यवेन परा द्विष्ठस्या ॥

7 मात्स्याप्य श्वेतं परी तत्साका शुक्रा ।

यदेष्या श्वेताश्वा मात्स्या श्वेताश्वा ।

यदेष्या शैवाश्वा तत्साका शुक्रा ।

क्लेश्येति यदेष्या शैवा श्वेता शुक्रा ॥

4. If a wise man behaves himself prudently, how can he be overpowered by the enemy, though they be many. That Brahman of Ujjayana, a single man, has overcome all the hosts of the enemy.

5. A brave, wise and a fortunate man (who has accumulated moral merits) though he be alone, overcomes all. The lion, the king of deer (or of wild beasts), and the universal monarch (a Chakravarti king) want no assistant.

6. If you are wise, you may make a slave of the great also. The Garuda, though a strong and mighty bird, is made the vehicle of Vishnu.

7. The wise, in the time of studying, suffer pains; since, without exertion, it is impossible to become wise. He that is passionate for a small pleasure, never can arrive at great felicity.

- 8 श्वर्ददृ भूकुरु लभ्यन् कृदियद् ।
 श्वर्यन् शत्रु दशामर्त्य श्वेष्टयंद् ।
 त्रीद्वयन् शुश्रृष्टे श्वर्यन् भूकुरु ।
 त्रीमर्त्य श्वर्ददृ भूकुरुन् यस्मि ॥
- 9 त्रृमर्त्यु थेन्यु मीदम् लीन् ।
 त्रृथाप्येति यद् यह्येत्यवृत्तिस् वीक् ।
 उद्येति थेक् शुद्य यस्मि मीदम् लीन् ।
 आत्मा पि शेषन् यस्मि त्रृस् मीदम् ॥
- 10 त्रीशन् यस्मि त्रृस् याद्यात्मा गृद् ।
 आत्मा पि केमन् कीर्तदन् शु लीक् ।
 लीन् मीद् रस्तु अन्या त्रृ गृष्मा श्री ।
 श्वे यात्मन् श्वे क्षेत्रे ॥ अत्मा पि यह्येत्याप्ते ॥
- 11 त्रृद्वय्य दम् यह्येति थेकुरुक् केमन् ।
 त्रृयेदम् यस्मि भूमिपत् श्वेशन् ।
 मात्यायाच्ची त्रृद्वय्य की ।
 त्रृद्वय्य त्रृशन् यस्त्रृ त्रृशन् यत् त्रृद् ॥
 अरन् करुद्वय्य । ।

8. If you are intelligent, though you be weak, what can do to you a powerful enemy? The king of the wild beasts (or of the deer), though strong, was killed by an intelligent hare.

9. The ocean is never satiate with water. The treasury of a king is never full of money. One is never satisfied with the enjoyment of a thing. Wise men are insatiable with elegant sayings.

10. From children also, wise men receive the fine sayings—for sweet scent the navel of a musk deer also is opened.

II. THE EXCELLENT (VIRTUOUS OR GOOD) (यामयन्)

11. It is always by excellent men that good qualities are more praised (celebrated). The scent of the Malaya Sandal-wood is diffused by the wind into the ten corners of the world.

- 12 दम्य दर्पेक्तुं पर्वत्सं शुद्धिः ।
 दक्षं शुश्रावद् पर्वत्सुर्वा देव्या ।
 कृष्णं शृणु मर्केका क्षेत्रं मर्केन्द्रिका ।
 शृणु शृणु यदे लेणा मात्रा तीमन्त्रेण ॥
- 13 शृणु दक्षं शृणु यदेणायाका ।
 शृणु धर्मं कृष्णं शृणु धर्मपत्रं रथुः ।
 तीमन्त्रं शृणु यद्य धर्मलमन्त्रं तकं तीमन्त्र ।
 अदन्त्रं त्वं रथये लिप्तं यथाहेन ॥
- 14 शृणु शृणु शृणु पर्वत्संपत्ति ।
 शृणु धर्मदं कृष्णं शृणु धर्मपत्रं शृणु ।
 रथुः पर्वत्संकृष्टं शृणु धर्मपत्रं शृणु ।
 अदन्त्रं शृणु यदन्त्रं शृणु धर्मपत्रं शृणु ॥
- 15 शृणु दम्य शृद्धं शुद्धं शृद्धं ।
 शृद्धं धर्मात्मदं शृणु धर्मपत्रं भवेत् ।
 भवेत् शृद्धं त्वं पर्वत्सं यथेका यथा ।
 भवेत् शृद्धं त्वं रथये धर्मपत्रं भवेत् ॥

12. If an excellent (or virtuous) man is chosen for Master, when every one finds his concern and happiness (or has his wish obtained). Wise men say : when the sacrifice is performed with a gem on the top of a banner, it is the sign of the happiness of that country.

13. When men are injured by a wicked prince, then will they remember a virtuous king. They that suffer of a malignant fever think only on cool water.

14. When a wicked prince does injury, a virtuous king is the more ready to defend. To him, that is occupied of an evil spirit, a magician (cheerfully) lends his assistance.

15. A virtuous man, though he decline (in his fortune) show, becomes himself more handsome in his behaviour. We see that a fire-brand though it be turned down, makes its flame ascend (or go upwards).

16

दम्यात् शुद्धका॑ एवेना॑ का॑ अद् ।

शर्वेऽपि॑ दयेन्ना॑ अन्याप्सा॑ शुद्धका॑ शुद्ध ।

मात्र॒ या॑ शृङ्कांके॑ द्विष्टाया॑ यीना॑

स्वार्थी॑ ये॑ देहा॑ इत्याप्ता॑ दयेथ ॥

17

षष्ठे॑ हृष्टं शृङ्का॑ इवेना॑ दयेन् यद्युष्टि॑ ।

द्विष्टा॑ देहा॑ एवेना॑ द्विष्टा॑ यस्ते॑ एवेना॑ दयेन् ।

दे॑ एवेना॑ मेवाप्तै॑ केऽपि॑ त्वंमा॑ शुद्ध ।

मात्रा॑ कैमना॑ दयेन्ना॑ शुद्ध॑ भी॑ त्वन् ॥

18

दम्यात् यदि॑ येहु॑ देहा॑ ज्ञानाशुद्धि॑ शुद्ध ।

द्विष्टा॑ देहा॑ युक्ता॑ या॑ इत्याप्ता॑ यामथ ।

शृङ्काप्रै॑ भी॑ देहा॑ इवेना॑ शृङ्काप्रै॑ शुद्ध ।

की॑ बीमा॑ युक्ता॑ इत्याप्ता॑ दशुद्धि॑ ॥

19

त्रित्याप्ते॑ इदं युक्ता॑ को॑ पा॑ दीर्घ ।

दम्यात् एवेना॑ त्रित्याप्ता॑ यस्तु ।

मेदेहा॑ यथाको॑ बीमा॑ या॑ महेन ।

एत्युषा॑ भी॑ कै॑ देहा॑ एवेना॑ एवेना॑ एकद ॥

16. A virtuous prince, though he be at a far distance, from far also does favourably protect his own followers. By the gathering together of big clouds in the atmosphere, the corn of the field more increases.

17. During life, renown (or a good name) is the cause of joy; in the other world, happiness is (man's) delight; in wealth only, without those two things, a wise man can have no pleasure.

18. Excellent qualities, though be exonerated, spread and become visible everywhere. The blossoms of the nutmeg tree, though grown dry, diffuse on all sides their sweet scent.

19. A king is great in his dominions; a virtuous man is respected whithersoever he goes. A flower is beautiful, generally, for a high day. A gem for a head ornament is every where esteemed.

- 20 शूद्रः स्त्रीः दुर्घाया रथनामुमदः ।
 मृगः दुर्घाया महान् रथे मवदः ।
 कौ मकेषा दुर्घाया रथे मत्तेष्वन् दे ।
 दम्याया दुर्घाया मात्रल्प एवै केष्व ॥
- 21 दम्यायकेमनः दद यथाया ।
 उपाया मवम् यद् इकामी रद ।
 विद् ला नायक् उद् मेद् शुद् ।
 र्होदेषा छुद्यत् दधिया छु मद् ॥
- 22 यवद् धेवि शूष्वन् त्रिष्वन् शूद्यन्यस्तुद् ।
 शूद्याया बम्बन् इविस्त्रिवन् ।
 ईक् दक् कै यवद् शु या रष्व ।
 द् यश्वन् न्यथा या शु विष्वेक ॥
- 23 केकायं रो विषा त्रुत्या शुद् शुद् ।
 द् या एक्तद्या शुभी दर्शन् ।
 ह्वायारेक्तिय ववन् व्रीक् यद् ।
 दम् यष्वाश्च श्वेत्यायत् रश्व ॥

20. A hen, when at rest, has much fruit; a peacock, when it remains still, has a handsome tail; a gentle horse has a swift pace; the quietness of a holy man is the sign of his being a wise man.

21. Though equal benefits be conferred on the excellent and the vulgar, the return of those kindnesses is not equal. Though there has been no difference in the seed sown in a field, yet there is an immense variety in the crop.

22. Keep up (preserve) your noble descent by your conduct—when your practice is bad, your birth is of no value. The Sandal-wood has a fine scent, but, if a man reduces it to charcoal, who will buy it?

23. The great, though sometimes they be distressed (or disgraced) for a while, have no reason to be grieved. The moon, though she be eclipsed for a while by the planet, yet soon appears again.

- 24 कैक्येष्वर्णश्चाथं श्रमस्तु पृष्ठं ।
 दशं निंदं दे थीं दयदंकं रक्षत् ।
 अदं पैसा पश्चात् परा शुकं पश्चादप्सा ।
 शुकं छैव शैवं पैत्रं दयदं पश्चात्पैत्रं ॥
- 25 दमं पा हित्तु त्रुदं त्रुटं त्रुदं ।
 शृणीं ददं रक्षन् पर्हि त्रवा मी त्र ।
 लोदं ले पशेव त्रुदं मी शठदं पर्हि ।
 दकं शृष्टन् त्रं पर्हि मी त्रुदं ॥
- 26 दमं पा श्वेषं ला पश्चात्यदं ।
 इदं पविकं पवदं पैत्राथा दैत ।
 ला ले शृमं कीं पशेषन् पठदं त्रुदं ।
 दीथीं त्रं दैत्यं लमं मी रक्षत् ॥
- 27 मुर्वा मक्षेषा कैमस्त्वा दमकं पा कैमस ।
 त्रिं यदं लक्षं दुः पा ला त्रि ।
 श्वेषदं इष्टन् पर्हि श्वेदं रक्षिकं यदं ।
 त्रि लुषन् शैवं पैसा श्वेदंहेव शृदं ॥

24. If a great man treats *kindly* an enemy, that very enemy comes with kindness into his power. The first universal monarch since he protected all, was elevated to that dignity by all.

25. The holy man, though he be distressed, does not eat of the food mixed with wickedness. The lion, though hungry, will not eat of the unclean vomiting.

26. The holy man, though it may cost him his life, how will he desist from what is good by itself? The colour of fine gold will not change, though it be burnt and cut.

27. Though low-minded men be wrathful (angry) to the holy men—but how would these, in return, become angry with them? Though the jackal utter a fustian language, yet the king of the deer protects him mercifully.

- 28 यद्यपि निदं क्षेत्रं स्तुये चैव ।
 शृङ् गर्क्षेत्रं रत्नां श्रीं दमनामनी ।
 रथकं वेत्रं इति क्षेत्रं यत्पुं यत्पुं ।
 मणिः त्रुमायानीं श्रीं विनीं शृङ् ॥
- 29 यश्चेद्यस्तु दमनायां श्रीं रत्नायां ।
 श्रद्धायां श्रीं दमनां श्रीं रत्नायां विदं ।
 यादं श्रीं येत्रं दक्षं वैष्णवायां यक्षन् ।
 शृङ् येद्यं दमा यहीं महत्कनिदं यत्पुं ॥
- 30 त्रिष्णं यं ददं क्षेत्रं शक्षुयं यत्पुं ।
 शृङ् यहीं वैष्णवायश्चेद्यं वैष्णवायश्चेद्यं क्षेत्रं ।
 श्रीं ददं श्रीं यां रघुदामं यदं ।
 दक्षेत्रं याद्यं यहीं क्षमायां यत्पुं ॥
- 31 रत्नेत्रं यां शुक्राशुभ्रं हौषणं शृङ् ।
 श्रीं येत्रं क्षिदं श्रीं क्षेत्रं यत्पुं ।
 दं यां शृङ् ।
 यद्यायां निदं यां श्रीं शक्षिणायां ॥

28. People seek to find fault with the excellent, and not with the low men. They look with astonishment to costly longings, but who would do so to a fire-brand?

29. Not to be cheered up by praise; not to be grieved by shame—but to know well his own perfections, is the characteristic sign of an excellent man.

30. Those are no vain riches that are gotten by knowledge, strength and skill. The dog and the cat, though they stand erect, are living samples of impudence.

31. It is the master's greatness, if his servants are in every respect well satisfied. The embellishments put on a horse, are they no ornaments for the master himself?

- 32 फ़िल्हालिल्हा फ़िल्हालिल्हा फ़िल्हालिल्हा ।
 राक्षस ए इव श्रीन यमुदस शुराप ।
 दिल्ली दिल्ली दिल्ली राक्षस अथवा वीर ।
 है दपेक निर्वाण गुरुम शुभ ॥
- 33 यदसकिं तेकर्षे बकर यर्वास ।
 मात्रपाप शब्द दश शु यंस क्षे ।
 मात्रप ए निम प्राप्यक ।
 क्षु श्वर मद अद मर्देद मीरूषु ॥
- आइयसायदमापाश्च ।
- 34 छेये दक्षय रूषु । देय शुद ।
 श्वापन शुर्व अम दक्षय रूषु ।
 रयम क्ष फ़िल्हा यमुश शुरु शुद ।
 शुद रयम य तेकर्ष रूद्द ॥
- 35 दमन ए श्वेदप यत्रद शुद अद ।
 दक्षि यत्तेव मरि क्षम प्र । यंक ।
 लेप व रूषु शुद त यमुश अद ।
 क्ष दद श्वदक रद मदेश शुक ॥

32. As the master takes care of, and kindly protects his servants (or subjects) so are managed the master's affairs also by the servants.

33. At the same place, where the great Lord (Buddha) is present, who would acknowledge any other wise man? When the sun has arisen, though there be many distinguished stars in the heaven, none of them is visible.

III. THE FOOL (MEAN, LOW, WICKED, BAD) (क्षुक्षु)

34. A wicked man, though he gets riches, grows worse in his conduct. A stream howsoever it be turned back, yet endeavours to flow downwards.

35. Though a wicked man appears good in his conduct, it is but a hypocritical life. Though a crystal be made to have the colour of a gem, yet, when put in water, it shows its own colour.

36 केवलं पर्वतं रथं कर्तुं यज्ञयापर्वतं शेषं ।

दक्षं पर्वतं श्वस्त्रियं अर्णवं तथा रथमन् ।

बीदं पर्वतं श्वस्त्रियं रथं रथं बीदं ।

संतुष्टं पर्वतं श्वस्त्रियं दुष्टान्तं श्वस्त्रियं ॥

37 दक्षं पर्वतं श्वस्त्रियं रथं बीदं श्वस्त्रियं ।

अद्य थैकं अवकाशं तथा रथं रथं श्वस्त्रियं ।

तत्र दुष्टं मं अर्णवं त्रिवर्षं पर्वतं अक्षुण्णु ।

तथा अर्णवं अवकाशं तथा रथं कर्तुं रथं ॥

38 शुश्रूषा पर्वतं श्वस्त्रियं ।

दक्षं नमस्त्रियं तथा रथं नमस्त्रियं रथं श्वस्त्रियं ।

आश्वेषं त्रिवर्षं पर्वतं यज्ञस्त्रियं यथैव ।

रथं श्वस्त्रियं रथं अद्य अद्य यज्ञस्त्रियं श्वस्त्रियं ॥

39 अर्णवं पर्वतं रथं यज्ञस्त्रियं ।

तत्र तथा शुश्रूषा पर्वतं रथं विष्णुम् ।

अर्णवं त्रिवर्षं यज्ञस्त्रियं पर्वतं शुश्रूषा पर्वतं ।

शुश्रूषा पर्वतं शुश्रूषा त्रिवर्षं यज्ञस्त्रियं अर्णवं ॥

36. A great man's wise arrangements are annihilated in a moment by wicked men. A cornfield cultivated for years and months by the husbandmen, is suddenly destroyed by a hail.

37. In general, a bad man rubs on others the defects which he has in himself. The crow, after having eaten some unclean thing, earnestly rubs her bill on a clean ground.

38. If a business be committed to a fool, it will fall short, and the fool himself will be crushed under it. The fox-born, being elected king, it is said, destroyed his distressed train also.

39. The foolish man (stupid) when he wishes for happiness, works only on his distress. Some one occupied by an evil spirit, when he wishes to be freed from pain, deprives himself of life.

- 40 द्वाष्ट एवक देक मी समस्या ।
 दैर्घ्य शुद्धप शुश्राद अश्वदन ।
 यवर यहु रयर विषाष्ट रष्यस्तुद ।
 यशुष्यपर त्रुष्यपर म यंकरे ॥
- 41 अक्षद मीशन मान्धद टेद ।
 श्वर दद वेस प मी यशुष्यपर ।
 श्वर रष्यस्तु रयर विष देक शक्ति य ।
 श्वर मेद्यपर्य यस्याय यंक ॥
- 42 श्वर पर्य द्विलाक दशर विद झे ।
 मादन पर्य मडकाक श्रुम विद रह्ये ।
 देश दद शेष मत्ता मेद्यक यद ।
 आर्य तक श्वी यस्याय यंक ॥
- 43 शदक यवर यहु येद देह शुष्य ।
 द्वेष पर्य श्वय अठेच यद रष्य ।
 माम दद यवद यद शेषक यद ।
 मक्षाम मेद पर्य श्वी तक यंक ॥

40. The action of a man, who cares nothing for the welfare of others, is like that of a beast. Though he is an associate at eating and drinking, but he is unable to make them ready (or prepare).

41. He that makes no reflection on what is useful and the contrary; and does not improve his understanding and experience, is a swine without hair, that seeks only to fill his belly.

42. Some one makes most among the fool, but before the wise, he shrinks back. Though he has no hump and dewlap, yet he is a beast that has his upper-teeth.

43. He hastens to where there is meat and drink; but if you give him some business to do, he runs away; though he can speak and laugh, yet he is an old dog without a tail.

- 44 वैष्णव द्विष्टा श्रुतीना दक्षद श्रावे ।
 मर्त्यं तुद श्रेष्ठ त्रिष्टा दक्षद श्रावे ।
 विद तुदा ना येक वदय श्रावे ।
 श्रुता तुदा र्वेषाधना अशुष्माण्ड ॥
- 45 इष्टव एवत्वा श्रुतप्य भव येक त्वक् ।
 तक्यर्थ्येयक यद नमनप्त रथ्यत् ।
 वेमाप्य एदाची लाउकिप्यन् ।
 श्रुत्यन् ज्ञव त्रिष्टा की ना अशुभ श्रेष्ठ ॥
- 46 श्रुत्येति तुदात् मात्रव पाप्यन् ।
 श्रुतु रक्षकाप्य त्रिद प्त रथ्यन् ।
 श्रु रक्षक मन दद वन श्रुता मक्त ।
 मात्रव पा वसापाश्चादप्त रथ्य ॥
- 47 येकानन अद्य पर्व श्रुत्य रथ्य ।
 येक दन त्वक् ए ज्ञव प्त श्रद ।
 मदन श्रु शुश्वर दक्षत श्रु पर्व ।
 श्रु देव ज्ञव दक् येक वेस श्रुत्य ॥

44. It is easy to fill with water a beast's (or ox's) foot-step—a small treasury may easily be filled with money; to sow a little field with corn seed, requires not much labour; it is easy to satisfy with science a little understanding.

45. A proud foolish promiser, though he be great, will be defeated. By having given a pace of ground (stob-l,dan) Balaráma has lost the three earths—(worlds).

46. In the estimation of ignorant people, a monkey-catcher is more preferable than a wise man—when that is served with butter and meat, this is sent empty handed away.

47. Some illiterate men are more inimical to a learned man. It is said, if in a snowy country, during the winter, grows up (or comes forth) any corn stalk, it is an unlucky omen.

48 येना नक्ता रूपा धरा शुद्धा पा रथै ।

रेषाम् धरा शुद्धा पा इन्द्रां वर्णै ।

श्वाम् केदा का श्वाम् शका रथै ।

यक्तव्यम् मेदामर्हि शुद्धांता छै ॥

49 कृषा नमस् पा रेषा पा केमस् ।

कृषा हृदा धरा शुद्धाम् यक्तिस् ।

नौदर्दा शुद्धांता शुद्धाम् ।

सदा यक्तिस् पा वा भीरा मि क्षि ॥

50 कृषा रूपा धरा शुद्धाम् रथै ।

एदाम् कृषा शुद्धाम् यक्तिस् ।

शुद्धाम् त्रियो वर्णो नक्ता केमस् ।

यक्तिस् यक्तिस् शुद्धा केदा यक्ति विषयक्तिस् ॥

51 रेषा इषा अदा पर्वा शुद्धार्थे केमस् ।

अदा यदा दशार्थे दयदांता रथै ।

शुद्धा कैवा शुद्धाम् शका त्रियो रूपा धरा ।

त्रि यदा शुद्धा शका वर्णिका विषा यक्तिस् ॥

48. Some that are ill-versed in science, will find fault with them that are well founded in it. In some islands it is counted for a defect in members, if one has not a goitre.

49. They that know only imperfectly the religious rites, contemn those that perform them exactly. In the country of Chara, he that walks on two feet, is not counted for a man.

50. Some that perform wrongly the religious ceremonies, mark them that do exercise them accurately. Those men that have a head like a dog, contemptuously say, that he, who has a handsome face, is a woman.

51. Foolish men, wanting understanding, though they be many, go full into the power of the enemy. One intelligent hare has subdued a whole herd of strong elephants.

52. शेष इया भेद्यरु रेदना हृदि शुदा ।

थथा क्ले इदाया थकाया त्रुदा ।

२५८८ रक्षा या यी रक्षा अदा ।

शेषुला रत्नदा या त्रु शमा यीक ॥

53. शुक्रपै रेदना हृदि शेषा कमसाय ।

शेषा त्रु यसमाया याया येद ।

त्रुषा त्रुषा यसमा दका त्रुका यीन ।

त्रुया यविका ता यसमासा नना रक्षी ॥

54. त्रुका ता यविका त्रुषा त्रुषा यसमायरी ।

त्रुया यविका त्रुषा त्रुषा यसमायरी ।

त्रुषा यविका त्रुषा त्रुषा यसमायरी ।

त्रुषा यविका त्रुषा त्रुषा यसमायरी ।

55. यत्रदा दका मात्रेषा इश्वर्षा यर्द ।

दा मक्की यसमा या मक्की या रहिता ।

मदका त्रुमा मदेदा या श्रुतायदा रहि ।

त्रुमा त्रुमा त्रुमा रुप्रदा त्रुमा यर्ह इश्वर ॥

52. It is seldom, that riches without understanding were advantageous to any one. The all-bestowing cow's milk, (as the common proverb is) is sucked up by the calf.

53. Foolish men, that amass riches, never think on, that they have their kinsfolk (or relations). After having amassed wealth, by all means of wickedness and cursing, they die away like the rats.

54. He that wants always to be defended (or supported) by others, at last, certainly shall fall. It is said, the tortoise, that was carried by two crows, fell down on the ground.

55. Not to understand what good and bad is; to forget a kindness done to one; not to marvel at what is marvellous; to ask again what one has clearly perceived; to think and to follow one from behind: are the characteristic signs of a foolish man.

- 56 द्युम्नं क्षेत्रस्य रथे कं महाम् शुद्धं थ ।
 अ॒ष्टं कं दे या श्वा रथे कं शुद्धं ।
 यवद् यहुद् मवेदान् कन्त्यैत्य रहुम् ।
 द्युम्नं क्षेत्रस्य रथे कं महाम् शुद्धं थ ॥
 शुद्धं पर्यं कर्तव्याप्यश्वे । 3
- 57 द्युम्नं पर्येदस्य शुद्धं केवलाथम् ।
 त्रिष्णुं ज्ञानं कुदं यस्य वीर्यात्मीयं अकेतुं ।
 यस्त्वा एव शुद्धं को दये श्वा यीव ।
 शुद्धं श्रीदं वीर्यं क्षेत्रस्य शुद्धं ॥
- 58 शुद्धं पर्यं अवान्त्रे दये रथे कं दे ।
 मात्रस्य यस्य अन्ते दये यद्युत्ता श्वे ।
 वृष्टि वा क्षेत्रे शुद्धं रथे कं दे ।
 क्षुद्रं शुद्धं यवद् यहुम् शुद्धं रथे कं दे ॥
- 59 येत्कान्त्रे त्रुदं केमना दात्त्वात् ।
 मात्रस्य यद्ये शुद्धं अन्ते यद्युत्ता अन्ते ।
 क्षुद्रं शुद्धं त्रुदं शुद्धं अन्ते ।
 शुद्धं अन्ते त्रुदं वा एव शुद्धं ॥

56. When the troops are advancing, he is in the rear; when they retire, he goes on the front; where there is meat and drink, he endeavours by all means to enter there.

IV. THE MIXED CHARACTER (OF THE WISE AND OF THE FOOL.) (वीर्याभ)

57. A mean fellow, though he be rich, is outdone by a little man of noble descent—when the hungry tiger uttered a deep sound, the monkey fell down from the top of a tree.

58. A foolish man tells his qualifications. A wise man keeps them secret within himself. The straw swims on the surface of water, but a gem, though placed upon it, sinks.

59. They, that have little learning, have great pride; when

- 60 श्लृष्टं दमनं ईमन्तं दमायता ।
 अहं एवं छेदं श्लृष्टं दमायता वीक् ।
 नेदं एवा श्वा क्षेषणं इषेण श्लृष्टं श्वे ।
 श्वा निदं श्वार्थं वीषणा या श्वद् ॥
- 61 दमायता श्लृष्टं श्वद् यज्ञदं का वी ।
 दमना या यज्ञदं का श्वायता यज्ञदन् ।
 अस्मां दक्षया श्वा यद् एत्रुं तपा श्वीय ।
 श्वीं श्वदं यज्ञाका हीं दका रश्वद् ।
- 62 मात्राना पा येका दका श्वरा श्वरादे ।
 श्वरा पौथा श्वरा रपहा वीषा यीक् ।
 दका पा को रपाना दक्षणा रद्दें रश्वद् ।
 श्वीथा एडाना या वीमना श्वरा श्वेद् ॥
- 63 श्वां श्लृष्टं ब्रह्मणं का ब्रह्मणा श्वद् नमण ।
 दमा पा श्वेदं का ब्रह्मणा श्वद् तथा ।
 ब्रह्मणा श्वी ब्रह्मका ब्रह्मका श्वी पा नद् ।
 का मक्षणा श्वेदं का तथा पा मष्टेद् ॥

grown wise, they are quiet. Torrents make always much noise, but it is seldom that the Ocean roars.

60. It is always the low-minded men that speak disdainfully of the holy men; these never do so to them. The lion defends the foxes, but the fox rises against the fox.

61. Though a generous man is angry against you, he is gentle if you bow down before him; but a low-minded man is more haughty if you yield to him. Gold and silver, though hard, may be melted, but a dog's ordure will stink, if put into fire.

62. A wise man consists entirely of perfections. A fool has only his defects. With precious metals you may pay all your expences—from a venomous serpent nothing but distress can be expected.

63. A wicked man, though he abides in a forest, is mean; a virtuous man, though he resides in a town, is gentle. We see that

- 64 शृंगा अक्षेषण इदाच्च शुर्कात्य लृ ।
 शृंगे दक्षय विवेक शुर्क रक्षेष ।
 शुर्कु इदा ची शुर्कात्य देष ।
 श्रीकृष्ण विवेक ता शुर्का दक्ष विवेद ॥
- 65 दक्षय तुथ यस्य इदा विवेक शुर्कु ।
 दक्षय इदव्य यस्य इदा विवेक शुर्कु ।
 दक्षय शुर्कु विवेक इदा विवेक यशुदा ।
 विवेक शुर्कु इदव्य यस्य इदा विवेक यश्विष ॥
- 66 गत्तेऽपि तुना का विवेक नदा विवेक ।
 विवेक शुर्कु शुर्कु शुर्कु नदा ।
 गत्तेऽपि शुर्कु गत्तेऽपि विवेक कुमा गत्ते ।
 विवेक यश्विष यश्विष शुर्कु अदा शुर्कु ॥
- 67 गत्ते यश्विष गत्ते की नदा यं लिप ।
 शुर्कु शुर्कु तुदा विवेक नदा गत्तेऽपि गत्तेऽपि ।
 शुर्कु तुदा शुर्कु शुर्कु यश्विष ।
 शुर्कु तुदा विवेक दक्षय वा अदा ॥

a wild beast of the forest is fierce, and a fine horse in the town is gentle.

64. An excellent man looks only on his own defects, a bad man seeks fault only with others. The peacock judges of his own body—a bat gives ill omens to others.

65. An excellent man, by his gentleness, preserves both himself and others; a bad man causes pain both to himself and to others by his stiffness. A fruit tree keeps (nourishes) both itself and others; a dry tree, by its stiffness cumbers both itself and others.

66. As long as you have wealth, every one is your kinsman, if you are declined, every one is your foe. The island of precious metals is visited from far distance—when the lake (or sea) is dried up every one leaves it off.

67. It is only by narrow-minded men, that such distinction is

- 68 येन् दक्षं ज्ञानाय येन् दक्षं य ।
 दक्षः ये येन् दक्षं विद्यकमनामीन् ।
 ज्ञानं क्षा रहीनाय विद्यकम् य ।
 दक्षः ये मा ज्ञानं दैज्ञ्यं गंग ॥
- 69 मात्राय पा मात्राय परिकदाना अहेत् ।
 ज्ञानं पर्यं मात्राय पैज्ञ्यं ये ।
 हेन् दक्षं विद्या यन् त्रिं द्वे य ।
 ज्ञानं पर्यं सेवा यत् उपायं अहेत् ॥
- 70 मात्राय पा इदं ये ज्ञानं ब्रह्मं श्रव्य ।
 ज्ञानं पर्यं विद्या यत् विद्याज्ञु रवद् ।
 त्वं त्वं युद्धं विद्या या ।
 ज्ञु एष्टका वेदायनं विद्या ज्ञानं ज्ञान ॥
- 71 मात्राय पा विद्या ज्ञानं यद् ।
 विद्या यस्मद् विद्या विद्या विद्या विद्या ।
 ज्ञानं पर्यं विद्या यद् उपायं द्वे यद् ।
 ज्ञानं पर्यं विद्या यद् विद्या विद्या ॥

made : this is our friend, this is our enemy. A liberal man is affectionate towards all—it is uncertain, who may yet be useful to us.

68. Learned men delight in science; the ignorant do not so. Honey-gathering bees resort to flowers; but not the flesh-fly.

69. A learned man is beautiful among learned men; How can the wise be understood by the fool? See, how Sandal-wood, that is more precious than gold, is by foolish people reduced to coal.

70. A wise man knows the manner of his action; the fool follows another's authority. When an old dog has barked, the others run without there being the least reason therefore.

71. A wise man, in his very declined state, also affords pleasure to others, by his elegant sayings—a fool when growing violent also consumes himself and others by his quarrelling.

72 ता॒ र्ण॑सा॒ श्वरा॒ प॒रा॒ शु॒ष्मा॒ प॒रा॒ श्वे॒ ।

था॒ था॒ मी॒ श्वे॒ देना॒ था॒ रथ॒ ।

हि॒ दका॒ द्वा॒ था॒ अद॒ला॒ र॒द्य॒ला॒ ।

तु॒ शुरा॒ हृ॒था॒ श्वामेन॒ रथ॒ ॥

73 द्वा॒रा॒ प॒र्ण॑था॒ धदा॒ धना॒ प॒रा॒ शु॒ष्मा॒ ।

श्वे॒ये॒ दका॒रा॒ मर्त्त॒रा॒ धदा॒ धर्त्त॒ ।

श्वा॒ कै॒मा॒ लिंगा॒ शुदा॒ लिंगा॒ तु॒ शुदा॒ ।

विना॒ है॒ रूप्तुमा॒ धदा॒ धा॒र्त्ते॒ धर्त्त॒ ॥

74 श्वे॒ये॒ द्वा॒रा॒ त्री॒का॒ ठेका॒ धविक॒ ।

कै॒मा॒ प॒रा॒ शुका॒ फ॒ र॒शुरा॒ ज्वे॒या॒ मेन॒ ।

श्वे॒ये॒ द्वा॒रा॒ शुदा॒ मद्द॒रा॒ ल॒द॒ ।

शुदा॒ वदा॒ त्तेमा॒ हृ॒ अर्द॒ द्वा॒रा॒ उद॒ ॥

75 हि॒ श्वेदा॒ द॒र्हा॒ ह॒र्दा॒ ध॒र्दा॒ शुरा॒प॒ ।

द॒र्हा॒ शेदा॒ ध॒र्दा॒ दका॒ तु॒ त्री॒सा॒ म॒र्द॒ ।

द॒र्हा॒ ह॒र्दा॒ त्तेमा॒ क॒ ध॒र्दा॒ दका॒ ल॒द॒ ।

शुश॒रा॒ श्वे॒ उ॒सा॒ दे॒ शुद्धमा॒ दका॒ रथ॒ ॥

72. Some place perfection in speaking—others are silent and penetrate into the meaning. A bad dog utters first a noise to the enemy: a cat catches tacitly a duck.

73. Though a virtuous man disputes, yet there exists advantage thereof; a fool causes damage by his friendship also. Though the gods be angry yet they defend the animate beings. The lord of death, though he smiles, yet kills an enemy.

74. An excellent man, like the precious metal, is, in every respect, invariable—a villain, like the beam of a balance, is always varying somewhat up—and downwards.

75. As long as one is modest, he is adorned with the chief quality—when modesty is gone, the good qualities become partial and an ill rumour spreads about.

- 76 दम्पदा मा पर्णसा रेषाम् पटा छृक ।
 दमन् पा इना शुदा रेषा पटा पशु ।
 त्रिथा शरी शरा वा अक्षया शुदा पक्ष
 रक्ते पदम् अक्षया शुदा असेन्दपार्थक ॥
- 77 पर्णसा वा अक्षया रक्षुटा पार्थिना ।
 वृष्टा अवृत् वा अक्षया रक्ष ।
 वृष्टा प्रटीका शुक्षाद ।
 उरुदृक्षा रक्षुटा त्री पदम् अक्षम ॥
- 78 नष्टप्रसवा शुदा दक्ष रक्षुयप ।
 शुदा यदा वाक्या कुमासा शाश्वतःश्चक ।
 रेषाम् पटा पशुष्वायसा शुदा दक्षश्वदम् ।
 दक्षा वाक्या कुमासा त्रिथा प्रसव ॥
- 79 दमा पद्महृषी दग्धा पशुम् पश्च ।
 दमन् पा द्युष्मा पशुम् पद्महृषी ।
 शुदा विद् दद वी लेथा प्रथी
 पश्चद् दद शुदा पशुम् पश्चद् पश्च ॥

76. A virtuous man gives without hypocrisy, an upright instruction—if you ask a villain, he will inform you wrong. Though you slight a Bodhisatwa, he is merciful to you—though you bestow praise on Yama (the lord of death) he is yet your destroyer.

77. What is useful to one, may sometimes be hurtful to another. When the moon rises the Kumuda opens and the Padma flower shrinks up.

78. Though, by wicked acts one may reach his aim; yet a wise man never resorts to such means. Wise men are not ashamed, if they can also not have their concern, provided they have righteously endeavoured therefore.

79. It is difficult to make dissension amongst the virtuous—but it is easy to reconcile them—low people can easily be separated, but difficultly reconciled. See what a difference there is between the Sandal tree, and the coal made of its wood.

80 द्वयपत्रविष्णु त्रुद्युम्नं शूद्रं ।

ह्लाय यवेन्द्र तु अद्य द्वे रुद्राः ।

द्वयक य एव एष त्रुद्युम्नं कृ ।

अद्यमा यवेन्द्रङ्क इति यद्य रुद्र ॥

81 द्वयक य रुद्राङ्क इश्वर्य पर्वी त्रु ।

द्वयप रुद्राङ्क तथायर्थं ह्लाय ।

ह्लाय रुद्राङ्क इश्वर्य पर्वी त्रुय ।

सेद ये रुद्राङ्क एवं यद्य नथ ॥

82 केस त्रुय द्वयाद्य द यद्यपाक ।

भूष्यपत्र इद्याच्छी रात्रेष्वाप्यमन् ।

क्यर्वी स्त्र य छिद्यपत्रङ्क ।

मार्क एतद्व रुद्राङ्क यद्य रुद्र ॥

83 श्वर्यद्वय द्वयाद्य ।

रुद्राङ्क द्वयपर्वीमनाङ्क रुद्र ।

एद्वर्वीत्रुवै इय लिम्य ।

त्रु एकं श्वेष्वाङ्क याकृष्ट रुद्र ॥

80. Though a virtuous man decline for awhile, yet, like the increasing moon, he rises again—if a low man once is decayed, he will be extinguished, like a lamp.

81. Wealth, to a low man, is a cause of pride,—to a virtuous man it is that of gentleness (or, humbleness). The fox-born, when he has filled his belly, behaves proudly, the lion, when his belly is full, takes his repose.

82. A virtuous prince shows more affection to his subjects, when he finds an enemy. A mother is more grieved on account of her diseased child.

83. A good person, if he associates with a bad man, will be infected by him. *The Ganges water, though very pleasing to the taste, when it has reached the sea, becomes brinish.*

84 द्वाका यस' मुर्गेर् अहेष' शुक'क ।

शुल्क'म् द्वा यहि मुर्ग'प' रक्तुद' ।

श' क्षुं तृष्णा' पहि यद' व्रष्ट'थ ।

श' क्षीदी' द' लभ' रक्तुद'थ' शुल्क' ॥

85 शुक' पे शुल्क' शुद' म' यश्चथ'य ।

द' यविन' यद्वा' नक' क्षेत्र'प' यक्ति ।

मद' यथा' त्रुद'क' यथ'य' ज्ञु ।

द्वाका' पहि मुर्ग'प' रक्तुद' शुल्क' के ॥

शुल्क' अ' यहेष' प' जु । 4

84. If a low-principled man keeps a holy person, his manners become like to those of a holy personage. See what a fragrant scent has the person who has anointed himself with musk.

85. As the Ricab (S. Sumeru) is not to be moved by any creature, so the great self-one (the excellent man) stands firm. As a small piece of cotton is easily moved, so the practice of a low-minded man, is greatly changing and turning.

(To be continued.)

Literary and Miscellaneous Intelligence.

The Journal *Asiatique* for August and September, No. 14, opens with a letter, by M. de Tchihatchef, pointing out the different spots in Asia Minor which struck him as likely to afford interesting results to antiquarian researches. He was five years in the country, which however, he was exploring with a view to studying its physical character. Then follows a notice by M. Cherbonneau on the journey of El-Abdery through N. Africa in the 7th Century A. H. and a continuation of M. Sanguinetti's translation of Ibn Ossai-bi'ah's History of Physicians. M. Clément Mullet, in a notice on the knowledge of Natural History by the Arabs, remarks on the extent to which they borrowed from the Greeks, and especially from Aristotle. Several interesting extracts are given from Maimonides, Damiry and Kazwini on the family of the Arachnides.

No. 15 of the same Journal for October and November contains Mr. Bazin's paper on the Administrative and Municipal Institutions of China. M. Woepcke commences his Inquiries into the history of the Mathematical Sciences in the East: his first Essay is on the employment of Algebraic notations by the Western Arabs to whom it was known, he shows, before the 13th century, though in none of the works on Algebra written by their countrymen in the East between the 9th and 17th centuries, is any kind of notation used. M. Pavie continues his extracts from the Bhoja Prabandha, the subject of his present article being the residence of Kálidása at the court of Bhoj.

No. 4 of the German Oriental Society's Journal contains Rödiger's Report for 1851 and 1852, a continuation of Grant's paper on the Tamul MSS. of the Leipzig Missionary Society, and of M. Haug's paper on Zend Researches. Then follows an interesting communication from M. Grotfend, sent to the Editor fourteen days only before the old man's death, on the most ancient traditions of the East. It consists of two papers, both dated November, 1853, the subject of one being Sennacherib as the hero-warrior of tradition, and that of the other being the first war on the earth which the author regards as an invention of later days. Freytag gives a

biographical sketch of Beha-oed-deen, an Arab writer of the 12th century, whose life of Saladin was published in the Chrestomathia Arabica.

Another Turkish Reading-book and Grammar has been published by Prof. Dicterici of Berlin, and a very admirable Selection of Extracts from Turkish authors by Prof. Wickerbanser of Vienna. In Arabic Wustenfeld has brought out an edition of Ibn Doraid's *الاشتقاق* under the title of 'Ibn Doraid's Genealogisch Etymologisches Hand-buch,' and Kosegarten, a Diwan of the Hudhail Arabs, entitled *Carmina Hudhailitarum*.

A translation of the first book of the Gulistan has been published anonymously in Calcutta, the text (Sprenger's edition) being interleaved. It is explained in a modest preface how this translation happens to appear as a rival, so far as it goes, to the elegant vol. of Prof. Eastwick.

In the Quarterly Journal of the London Geological Society will be found Abstracts of two interesting papers, for which the materials have been contributed by the Rev. Messrs. Hislop and Hunter. One is on the Geology of Nagpur and the other gives a description, by Professor Owen, of the Cranium of a Labyrinthodont Reptile (*Brachyops breviceps*) from Mangali in that province.

The following extract from a letter from Dr. Sprenger will show the interest with which he watches our Society's proceedings in the Oriental Department.

" I have a copy of the second volume of the *Icéabah* which may be of some use to the Editors. My collection of works on the Qorân is increasing and I hope I shall find time to write a good analysis of the *Itqán*. Kindly put aside two copies for me of each Arabic work printed, and a greater number of the Logic, and of *Tûsy*. I fear I shall be obliged to revise several of these works and give a list of variantes and corrections because these gentlemen are not over-careful in their labours. I congratulate the Society on the rapid progress of the *Bibliotheca*, which will be more evident when some of the large works are completed. In the selection of Arabic works, a system has been followed, which if carried out, will place Muhammadan learning and also history in quite a new light. The

biographical works, *Túsý* and the *Içábah*, which must be followed by *Dzohaby*, give us an insight into the literary activity of this interesting nation during the first centuries of their existence, whilst the Dictionary of technical terms together with the Compendia (with the Logic) forms an Encyclopædia of all their sciences during the second period of their existence, which is now just closing ; the *Itqán* shows us the field of the *Qorân* in its whole extent, and is the basis of the study of that book, which is the seed from which all intellectual activity of the Mawlawies originally developed itself. Whilst the Society is thus engaged in furnishing to the philosophical orientalist, materials for following up the history of the Musalman mind, it has not neglected to preserve materials for what is vulgarly termed, history. No works surpass in importance the conquests of Abu Ismayl and Wáqidy, and I hope there will be added to them those of Biládzory. The work is not large and even if the expense should be proportionately somewhat greater than for other publications, it is to be remembered that there is no other work of equal value known. I have a particular fancy for the conquests of the Moslems. The philosopher may have other means to demonstrate the irresistible powers of heat, the vulgar, however, becomes best aware of them by witnessing a conflagration. In this manner are the conquests of the Moslems the most unmistakeable evidence of the power of enthusiasm on the mind—over wealth and matter generally. In history, it is to be hoped, the Society will next turn its attention to the state of civilization under the Abbásides. After we have studied a convulsion, it is interesting to observe the organic formations which grow up on the cooled surface of the soil which it has raised. The geography of Maqdisy regarding which I have written to my friend Lees, will form an excellent basis as soon as our hands are less full than at present. The most important materials on this subject are found in the *Kitáb al-Aghány*. Prof. Kosegarten has commenced to edit the work, and has published in the space of about ten years (I speak from memory) about the twentieth part. He has since undertaken new labours, and it is not to be expected that he will in future proceed with greater activity, and therefore unless he should be preserved for science a hundred years longer, it is not likely that his edition will ever be completed. However, I

believe he has formally given it up. It would be a great undertaking to bring out this work. Dr. Wetzstein tells me that there is a copy here at Damascus which the proprietor has offered for sale for Rs. 200 (or a fraction less) and I have two copies of it in India. This would enable us to found a tolerably good text. Dr. Wetzstein offers to collate and correct the text if paid for his labour. The work itself is so well known that I need not enter into a long description of it. The author of the text which we have now, (there existed an older text by Mawçily) flourished in the fourth century: the work consists of the songs which enlivened the parties of the Khalifs and their courts, but it contains also the biographies of the poets, and celebrated singers, and an infinite number of historical anecdotes which, in fact, form the main portion of the work and give us a very great insight into the social and domestic life of the Arabs. The book would fill about 20 numbers 8vo. of the *Bibliotheca*. Should the Society decide on publishing it, you must authorize me to purchase the MSS. for I do not wish to buy it for myself, having already two."

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,

FOR FEBRUARY, 1855.

At a meeting of the Society held on the 3rd instant.

SIR JAMES COLVILE, Kt. President in the Chair.

The Proceedings of the December and January meetings were read and, after certain modifications, confirmed.

Presentations were received—

1. From Prof. Oldham, Geological specimens from the Sivok Nadi, in the Darjiling district.
2. From Bábu Rádánáth Sikdár, two copies of the Máshik Pátriká, No. 5.

3. From the Right Rev. Bishop of Victoria through Lt.-Col. W. Anderson, 2 pamphlets being Narrative of a Mission of Inquiry to the Jewish Synagogue at Kaefungfoo, and Fac-similes of the Hebrew Manuscripts obtained at the same place.

4. From Col. Grove through Capt. Thuillier, Section of a Gurjun or oil-wood timber from Arracan perforated by worms, and shells of different marine worms from the same wood.

Col. Grove states "I have seen marks of one worm as long as 18 inches, and in form often resembling the marks and size of an usual cheese worm. The iron-wood timber of 18 inches in diameter, having attained maturity, is as easily pierced as the one before you, though only in this ratio that Gurjun would be utterly destroyed in three years, whereas the iron might take five."

With regard to the shells he adds "the very white bit is from the worm in its infancy and when entire would measure about 10 inches. All the shells belong to different worms."

5. From Dr. Spilsbury on the part of Dr. Young, specimens of fossils from Scinde. "The collection comprises thirty different portions of teeth and bones of Mastodons, Rhinoceros, Ruminants, Alligators, Fish, Ostræa, &c., the whole of which on examination and classification will, I trust, prove of considerable interest and be deemed a valuable addition to the Fossil Department of the Museum."

Mr. Young states "that these fossils are found close to Sehwan on the north side of the Jukkee hills, in a low range of sandstone breccia composed of angular pieces of nummulitic limestone cemented with clay.

"The sandstone in many places too, contains pieces of the limestone. Some of this is seen in the longest specimen of a vertebra."

The following gentlemen were named for ballot at the next meeting.

Rájá Rádhakanta Deb, as an honorary member, proposed by the Council.

D. G. Nicholson, Esq. Assistant Commissioner at Moulmein, proposed by Bábu Ramgopal Ghose and seconded by Dr. Macrae.

Rowland Hamilton, Esq. proposed by Mr. Woodrow and seconded by Col. Baker.

Read letters intimating that Sir L. Peel and Dr. Stewart wished to withdraw from the Society, as they are shortly to leave India.

The Council announced that they had appointed the following sub-Committees, viz :

Finance. Lt.-Col. Baker and C. Allen, Esq.

Philological. Lt. Lees, Dr. Röer, Rev. Mr. Long, and F. E. Hall, Esq.

Library. Dr. Walker, Mr. Woodrow, Capt. Thuillier, Bábu Ramá-persad Roy and Mr. Grapell.

Natural History. Dr. Spilsbury, Dr. Walker, Dr. Macrae, Lt.-Col. Baker, and Dr. Boycott.

They also submitted the following report.

"The attention of the Council has been lately drawn to the magnificent series of fossil specimens from the Nerbudda contributed between the years 1832 and 1848, by Dr. Spilsbury.

"As regards the importance of the specimens, some of them, more especially the magnificent series illustrating the Segownee fossil elephant, are so remarkable for their stupendous magnitude and perfect preservation as to be unrivalled in any other Museum in the world. But their scientific interest is of still greater value, as they have chiefly been the means of establishing an extensive fossil Fauna on the Nerbudda.

"Dr. Spilsbury's merits were not merely those of a collector of fossils; in most cases he accurately defined and indentified his specimens; and it was probably the want of the necessary means of reference and comparison in a remote locality, and the innate modesty of his character that prevented Dr. Spilsbury from giving to the world a full and complete account of his researches in a connected form.

"Dr. Spilsbury's contributions have further been marked by as great liberality, as zeal in behalf of the Society. The Council consider, that they have served alike to enrich the Society's Museum and to advance the progress of science. On these grounds, they are of opinion that Dr. Spilsbury is entitled to a public recognition of his services; and the Council propose that a subscription be entered upon, among the members and the friends of science for a Portrait of Dr. Spilsbury, to be hung up in the Society's Rooms."

This report was unanimously adopted and ordered to be circulated among the resident members; a large number of those present at the meeting entered their names as subscribers.

Communications were received—

1. From Rev. S. Slater, forwarding the remainder of an English translation of an Urdu Tale by Inshá Allah Khán, for the Journal.
2. From Bábu Rádhánáth Sikdár, submitting abstracts of Meteorological Register kept in the Surveyor General's Office for the month of September last.

3. From T. Harris, Esq. American Consul at Ningpo, submitting, for exhibition to the Society, fac-simile of two inscriptions from the Island of Putu in the Chusan Archipelago.

4. From A. W. Russell, Esq. Under-Secretary to the Government of Bengal, enclosing the following correspondence regarding the ruins of Rajmahal.

Extract from a letter from the Officiating Secretary to the Government of India, Home Department, to the Secretary to the Government of Bengal, No. 829, dated the 10th August, 1854.

Para. 2.—“The Most Noble the Governor General in Council requests the attention of the Hon’ble the Lieutenant-Governor to Lieutenant-Colonel Baker’s remarks on the above application, especially with reference to the ruins of the palace at Rajmahal, which the Railway Company wish to take possession of, and, for the most part, to ‘convert into Ballast,’ and to the ground applied for Westward of the line of Railway, at present very generally occupied by native huts, the removal of which, as contemplated by the Railway Company, would be objectionable.

3.—The Governor General in Council observes that it *may* be necessary that the ruins of the old palace at Rajmahal should be overthrown, but His Lordship in Council is desirous, before according his assent to the measure, to have some better voucher than the opinion of the Chief Engineer of the Railway Company for the conclusion that the sooner these buildings are converted into Railway ballast the better. His Lordship in Council therefore requests that the Hon’ble the Lieutenant-Governor will be good enough to advise the Government of India, as to whether those ruins are in a state worth preserving or not.”

Extract from a letter from the Secretary to the Government of Bengal, to the Officiating Secretary to the Government of India, Home Department, No. 75, dated the 30th November, 1854.

Para. 1.—“Adverting to the letter from your Office, No. 829, dated the 10th August last, with enclosures, I am directed to state for the information of the most Noble the Governor General of India in Council, that the Lieutenant-Governor after a personal inspection of the Ruins at Rajmahal, is constrained to adopt the opinion already formed by the officer of the Railway Company; namely, that the structures are generally in so dilapidated a condition as not to be worth preserving. The chief ornament of the ruins in former years, the ‘Sangh-i-dalan’ has been lately very much dismantled and has, moreover, been already appropriated by the Railway officers and wholly disfigured by being built up. It seemed to the Lieutenant-Governor very doubtful however, whether, even if the whole of the modern masonry were removed, sufficient of the old building would remain, to render it an object worthy of preservation.”

(True Extract.)

A. W. RUSSEL,
Under-Secretary to the Government of Bengal.

5. From H. H. Smyth, Esq. Foreign Secretary to the Royal Society of London, acknowledging receipt of the Journal, Nos. 1 @ 4 for 1854 and the Bird Catalogue.

The Librarian and the Curator of the Zoological Museum submitted their usual monthly reports.

On the conclusion of the ordinary business, Dr. Falconer, agreeably to a previous intimation to that effect sanctioned by the Council, made an oral communication on the probable relations of the great extinct Tortoise of India to certain myths occupying a prominent place in the very early Greek and Hindu Cosmogonies. The question had been raised elsewhere before, without having attracted sufficient attention, and Dr. Falconer brought it before the Society in the hope that the interest of the Oriental Section might be awakened in regard to it.

The purport of Dr. F.'s remarks which he illustrated by diagrams, will be best understood by reprinting the following extracts from the Proceedings of the London Zoological Society, for March and May, 1844.

A communication was made by Dr. Falconer, conveying the substance of a paper by Capt. Cautley and himself on the osteological characters and palaeontological history of the *Colossochelys Atlas*, a fossil tortoise of enormous size, from the tertiary strata of the Sewalik hills in the north of India—a tertiary chain apparently formed by the detritus of the Himalaya mountains.

"A great number of huge fragments, derived from all parts of the skeleton, except the neck and tail, were exhibited on the table, illustrative of a diagram by Mr. Scharf of the animal restored to the natural size.

"The communication opened with a reference to the reptilian forms discovered in the fossil slate, among which colossal representatives have been found of all the known tribes, such as the *Iguanodon*, *Megalosaurus*, *Labyrinthodon*, &c., besides numerous forms of which no living analogues exist, such as the *Eneliosaurian* reptiles and *Pterodactyles*. No fossil *Testudinata* remarkable either for size or deviation from existing forms, have hitherto been found in the fossil state. The *Colossochelys* supplies the blank in the first respect, while it differs so little from the land-tortoises in the general construction of its osseous frame, as hardly to constitute more than a subgenus of *Testudo*.

" The plastron or sternal portion of the shell affords the chief distinctive character. The episternal portion in the adult is six and a half inches thick, and contracted into a diameter of eight inches, bifid at the apex, and supplied with a thick cuneiform keel on its inferior side : this keel constitutes one of the principal features in the fossil. The entosternal portion exhibits exactly the form of *Testudo*, the same being the case with the xiphiosternal or posterior portion. The plastron in the adult animal was estimated to be nine feet four inches long.

" The carapace or buckler of the shell coincides exactly with the general form of the large land-tortoises, of which it exhibits only a magnified representation, flattened at the top and vertical at the sides, with the same outline and recurved margin. The shell was estimated to have been twelve feet three inches long, eight feet in diameter, and six feet high.

" The extremities were described as constructed exactly as in the land-tortoises, in which the form of the femur and humerus is marked by peculiar characters. These bones in the fossil were of a huge size, corresponding to the dimensions of the shell. The ungual bones indicated a foot as large as that of the largest Rhinoceros. The humerus was more curved, and the articulating head more globular and deeper in the fossil, from which it was inferred that it had a stronger articulation, greater rotation, and that the *Colossochelys* was enabled to bring its anterior extremities more under its weight than is the case with existing tortoises.

" The affinities with *Testudo* shown in the shell and extremities were found to hold equally good in the construction of the head, of which a comparatively small-sized specimen, inferred to have belonged to a young or half-grown *Colossochelys*, was exhibited. The head of the adult to correspond with the dimensions of the shell, and according to the proportions furnished by a large *Testudo Indica*, was deduced to have been two feet long.

" There were no ascertained cervical vertebrae to afford direct evidence as to the length of the neck, which was constructed in the diagram relatively to the proportions of *Testudo Indica*. The entire length of the *Colossochelys Atlas* was inferred to have been about eighteen feet, and that it stood upwards of seven feet high.

" The generic name given by the discoverers has reference to the colossal size of the fossil (*κολοσσός* et *χέλυς*), and the specific one to its fitting representation of the mythological tortoise that sustained the world, according to the systems of Indian cosmogony.

"The anatomical details occupied so much of the evening, that space was not left for Dr. Falconer to enter on general points connected with the fossil, such as its possible connexion with the mythological fables of the Hindoos and the era of its extinction, which will form the subject of another communication.

"The results of a chemical analysis of the bones by Mr. Middleton were communicated, showing that they contained a very large quantity of fluorine. Some rough sketches of the *Colossochelys* were exhibited, etched on glass by means of the fluorine yielded by its own bones. The analysis indicated the presence of 11 per cent. of fluoride of calcium."

"*Colossochelys Atlas*.—The first fossil remains of this colossal tortoise were discovered by us in 1835 in the tertiary strata of the Sewalik Hills, or Sub-Himalayahs skirting the southern foot of the great Himalayah chain. They were found associated with the remains of four extinct species of Mastodon and Elephant, species of Rhinoceros, *Hippopotamus*, Horse, *Anoplotherium*, Camel, Giraffe, *Sivatherium*, and a vast number of other Mammalia, including four or five species of Quadruped. The Sewalik fauna included also a great number of reptilian forms, such as crocodiles and land and freshwater tortoises. Some of the crocodiles belong to extinct species, but others appear to be absolutely identical with species now living in the rivers of India: we allude in particular to the *Crocodilus longirostris*, from the existing forms of which we have been unable to detect any difference in heads dug out of the Sewalik Hills. The same result applies to the existing *Emys tectum*, now a common species found in all parts of India. A very perfect fossil specimen, presenting the greater part of the evidence of the dermal scutes, is undistinguishable from the living forms, not varying more from these than they do among each other. Prof. Thomas Bell, the highest living authority on the family, after a rigid examination, confirms the result at which we had arrived, that there are no characters shown by the fossil to justify its separation from the living *Emys tectum*. There are other cases which appear to yield similar results, but the evidence has not yet been sufficiently examined to justify a confident affirmation of the identity at present.

"The remains of the *Colossochelys* were collected during a period of eight or nine years along a range of eighty miles of hilly country: they belong in consequence to a great number of different animals, varying in size and age. From the circumstances under which they are met with, in crushed fragments, contained in elevated strata which have undergone great disturbance, there is little room for hope that a perfect shell, or anything approaching a complete skeleton, will ever be found in the Se-

walik Hills. It is to be mentioned, however, that remains of many of the animals associated with the *Colossochelys* in the Sewalik Hills have been discovered along the banks of the Irrawaddi in Ava, and in Perim Island in the Gulf of Cambay, showing that the same extinct fauna was formerly spread over the whole continent of India.

"This is not the place to enter upon the geological question of the age of the Sewalik strata; suffice it to say, that the general bearing of the evidence is that they belong to the newer tertiary period. But another question arises: 'Are there any indications as to when this gigantic tortoise became extinct? or are there grounds for entertaining the opinion that it may have descended to the human period?' Any *a-priori* improbability, that an animal so hugely disproportionate to existing species should have lived down to be a contemporary with man, is destroyed by the fact that other species of Chelonians which were coeval with the *Colossochelys* in the same fauna, have reached to the present time; and what is true in this respect of one species in a tribe, may be equally true of every other placed under the same circumstances. We have as yet no direct evidence to the point, from remains dug out of recent alluvial deposits; nor is there any historical testimony confirming it; but there are traditions connected with the cosmogonic speculations of almost all Eastern nations having reference to a tortoise of such gigantic size, as to be associated in their fabulous accounts with the elephant. Was this tortoise a mere creature of the imagination, or was the idea of it drawn from a reality like the *Colossochelys*?

"Without attempting to follow the tortoise tradition through all its ramifications, we may allude to the interesting fact of its existence even among the natives of America. The Iroquois Indians believed that there were originally, before the creation of the globe, six male beings in the air, but subject to mortality. There was no female among them to perpetuate their race; but learning that there was a being of this sort in heaven, one of them undertook the dangerous task of carrying her away. A bird (like the Garuda of Vishnoo or the Eagle of Jupiter) became the vehicle. He seduced the female by flattery and presents: she was turned out of heaven by the supreme deity, but was fortunately received upon the back of a tortoise, when the otter (an important agent in all the traditions of the American Indians) and the fishes disturbed the mud at the bottom of the ocean, and drawing it up round the tortoise formed a small island, which increasing gradually became the earth. We may trace this tradition to an Eastern source, from the circumstance that the female is said to have had two sons, one of whom slew the other; after which she had several children, from whom sprung the human race.

"In this fable we have no comparative data as to the size of the tortoise, but in the Pythagorean cosmogony the infant world is represented as having been placed on the back of *an elephant, which was sustained on a huge tortoise.* It is in the Hindoo accounts, however, that we find the fable most circumstantially told, and especially in what relates to the second Avatar of Vishnoo, when the ocean was churned by means of the mountain Mundar placed on the back of the king of the tortoises, and the serpent Basokee used for the churning-rope. Vishnoo was made to assume the form of the tortoise and sustain the created world on his back to make it stable. So completely has this fable been impressed on the faith of the country, that the Hindoos to this day even believe that the world rests on the back of a tortoise. Sir William Jones gives the following as a translation from the great lyric poet Jyadeva: 'The earth stands firm on thy immensely broad back, which grows larger from the callus occasioned by bearing that vast burden. O Cesava! assuming the body of a tortoise, be victorious! Oh! Hurry, Lord of the Universe!'

"The next occasion in Indian mythology where the tortoise figures prominently is in the narratives of the feats of the bird-demigod 'Garúda,' the carrier of Vishnoo. After stating the circumstances of his birth, and the disputes between his mother Vinúta and 'Kudroo,' the mother of the serpent, it is mentioned that he was sent on an expedition to bring 'Chundra' the moon, from whom the serpents were to derive the water of immortality. While pursuing his journey, amidst strange adventures, Garúda met his father Kúshgífa, who directed him to 'appease his hunger at a certain lake, where *an elephant and tortoise were fighting.* The body of the tortoise was eighty miles long—the elephant's 160. Garúda with one claw seized the elephant—with the other the tortoise, and perched with them on a tree 800 miles high.' He is then, after sundry adventures, stated to have fled to a mountain on an uninhabited country, and finished his repast on the tortoise and elephant.

"In these three instances, taken from Pythagoras and the Hindoo mythology, we have reference to a gigantic form of tortoise, comparable in size with the elephant. Hence the question arises, are we to consider the idea as a mere fiction of the imagination, like the Minotaur and the chimæra, the griffin, the dragon, and the cartazonon, &c., or as founded on some justifying reality? The Greek and Persian monsters are composed of fanciful and wild combinations of different portions of known animals into impossible forms, and, as Cuvier fitly remarks, they are merely the progeny of uncurbed imagination; but in the Indian cosmogonic forms we may trace an image of congruity through the cloud of ex-

aggeration with which they are invested. We have the elephant, then as at present, the largest of land animals, a fit supporter of the infant world ; in the serpent Basokee, used at the churning of the ocean, we may trace a representative of the gigantic Indian python ; and in the bird-god Garúda, with all his attributes, we may detect the gigantic crane of India (*Cicconia gigantea*) as supplying the origin. In like manner, the *Colossochelys* would supply a consistent representative of the tortoise that sustained the elephant and the world together. But if we are to suppose that the mythological notion of the tortoise was derived, as a symbol of strength, from some one of those small species which are now known to exist in India, this congruity of ideas, this harmony of representation would be at once violated ; it would be as legitimate to talk of a rat or a mouse contending with an elephant, as of any known Indian tortoise to do the same in the case of the fable of Garúda. The fancy would scout the image as incongruous, and the weight even of mythology would not be strong enough to enforce it on the faith of the most superstitious epoch of the human race.

"But the indications of mythological tradition are in every case vague and uncertain, and in the present instance we would not lay undue weight on the tendencies of such as concern the tortoise. We have entered so much at length on them on this occasion, from the important bearing which the point has on a very remarkable matter of early belief entertained by a large portion of the human race. The result at which we have arrived is, that there are fair grounds for entertaining the belief as probable that the *Colossochelys Atlas* may have lived down to an early period of the human epoch and become extinct since :—1st, from the fact that other Chelonian species and crocodiles, contemporaries of the *Colossochelys* in the Sewalik fauna, have survived ; 2nd, from the indications of mythology in regard to a gigantic species of tortoise in India."

Report of Curator, Zoological Department, for February Meeting, 1855.

SIR,—The following specimens have been added to the Museum since the preparation of my last Report.

1. From Capt. T. C. Blagrave. A small collection, procured (as there is reason to believe) in the Alpine Punjab. Of mammalia, are sent one Bat, *NYCTICIGUS LUTEUS*, and skulls of *GAZELLA CORA*. And of birds, the following species, including one novelty.—*GARRULAX LINEATUS*, *PARUS CINEREUS*, *PASSEE INDICUS* (albinoid young), *P. CINNAMOMEUS*, *HESPERI*.

PHONA AFFINIS, n. s.* HETERURA SYLVANA, MOTACILLA BOARULA, DRYMOICA CEINIGER, LANIUS HARDWICKII, MONTICOLA CINCOLORHYNCHA, PRATINCOLA FERREA, MUSCICAPULA SUPERCILIARIS, STOPAROLA MELANOPS, PHYLLOSCOPUS VIRIDANUS, and TURTUR ORIENTALIS.

2. Lt. S. Owen, 19th B. N. I. The skin of a Tern, procured in the Bay of Bengal; being the young of ONYCHOPRION MELANAUCHEN, (Tem.), formerly described by the provisional name *Sterna* (?) *marginata* in *J. A. S.* XV, 373. This specimen is peculiarly interesting, as further confirming, by its coloration, the propriety of arranging the species as an ONYCHOPRION. The head is quite as in *O. ANASTHETUS*; and the dusky hue of other species of the genus is conspicuously shewn on the anterior margin of the wing, and less intensely on the remiges. The structure is altogether that of ONYCHOPRION.

3. Capt. Berdmore, Scheu Gyen, Pegu. Skin of CAPECORNIS SUMATRENsis; and a young living Monkey, apparently of the species INUUS ARCTOIDES.

4. Capt. S. R. Tickell, Maulmein. A few bird-skins, including TRICHOSTOMA ABBOTTI, nobis; never previously received from so southern a locality.

5. From the Barrackpore menagerie. A dead Tenasserim Pheasant, GALLOPHASIS LINEATUS.

6. Mons. St. Ives. A pair of small Australian birds, MYZANTHE HIRUNDINACEA.

7. Capt. W. S. Sherwill. Two snakes in spirit, BOA CONICA and LYCODON AULICUS.

* HESPERIPHONA AFFINIS, nobis. Nearly affined to *H. ICTERIOIDES* (*Coccothrauses icterioides*, Vigors). From which the male is distinguished,—1, by being smaller, the closed wing measuring $4\frac{1}{2}$ in. (instead of $5\frac{1}{2}$ in.,) and tail $3\frac{1}{2}$ in. (instead of $3\frac{3}{4}$ in.);—2, by the black portion of the plumage being of a deep and shining black, instead of being dull with a distinct ashy tinge;—and 3, by having black axillaries and yellow tibial feathers, instead of yellow axillaries and black tibials, as in *H. ICTERIOIDES*. The females are much more dissimilar: that of *H. AFFINIS* having the upper parts olive-green, tinged with yellow on the collar and rump, and more brightly on the lower parts; wings and tail black, the coverts, secondaries and tertaries broadly margined externally with yellowish olive-green, occupying the whole outer web of the last; crown and ear-coverts ash-coloured, passing to pale grey on the throat. Young male like the adult, but the yellow much less intense. The adult male so nearly resembles that of *H. ICTERIOIDES*, that its distinctness would scarcely have been suspected, had it not been for the great difference of the other sex.

8. Capt. H. B. Weston. Some portions of timber honey-combed by the TEREDO NAVALIS.

9. Mr. P. Anderson (provisionally). The carcass of a Caracal (FELIS CARACAL), from Multan; both skin and skeleton of which have been prepared.

We have also to notice a small purchased collection of bird-skins, which has yielded several species new to the museum, and among them some of considerable rarity and beauty. They are from various parts of the world. From China, a fine specimen of the Mandarin Duck (*AIX GALE-RICULATA*), in splendid plumage. From Malacca, *IERAX EUTOLMOS*, Hodgson, never before recorded from so southern a locality, though known to inhabit the Tenasserim provinces; and two or three others. From Australia, *TINUNCULUS CENCHROIDES*; *ACCIPITER TOBQUATUS*, *juv.*; the beautiful Chesnut bronze-wing Pigeon, *PHAPS ELEGANS*; *AMADINA OCULEA*; and other species new to the museum. From S. Africa, *TROGON* (*APALODERMA*) *NARINA* (fine); *HYPHANTORNIS* (?) *OCULARIUS*; and *NECTARINIA SENECAELENESIS*, of extreme beauty. From America two superb Jays, *CYANOCORAX* (*Uroleuca*, Pr. Bonap.) *CYANOLEUCA*, Pr. Max. (*Corvus cristatellus*, Tem.), and *CYANOGABULUS CORONATUS*, (Swainson); *AMPELIS CAROLINENSIS* (very fine); two Parrots, *CYANOLISEUS PATAGONICUS*, and *MICROSITTACE SQUAMATA*, (Latham, v. *versicolor*, Shaw, and *erythrogaster*, Lichtenstein); *PHIBALURA FLAVIROSTRIS*; *TITYRA ROSEICOLLIS*; *SALTATOR MAGNUS*, (Gm.); *S. RUBICUS*, Vieillot; *CALLOSPIZA CAYANNENSIS*; *PITYLUS AUREIVENTRIS*, *juv.*; *EMBERNAGRA Sp.*; *CERERA CYANEA*, fæm.; *DACNIS CAYANA*; *TRICHAS MARILARDICA*; *Tr. CANICAPILLA* (*Tanagra canicapilla*, Swainson, *Zool. Ill.* 1st series, pl. 174; *Tr. Delafeldi*, Audubon); *PIPRA* (2 sp., undetermined); and *TRINGA PECTORALIS*: altogether an interesting series of acquisitions.

E. BLYTH.

LITERARY.

The following books have been added to the library since Dec. last.

Presented.

The Annals of the Lyceum of Natural History of New York, for 1851-52.—BY THE LYCEUM.

A Narrative of a Mission of Inquiry to the Jewish Synagogue at Kae-fung-foo, 8vo. pamphlet.—BY HIS GRACE THE BISHOP OF VICTORIA.

Facsimiles of the Hebrew MSS. obtained at the Jewish Synagogue in Kae-fung-foo, 8vo. pamphlet.—BY THE SAME.

Catalogue of the Described Coleoptera of the United States, by F. E. Melsheimer, Washington, 1853, 8vo.—BY THE SMITHSONIAN INSTITUTION.

Smithsonian Contributions to Knowledge, Vol. VI.—BY THE SMITHSONIAN INSTITUTION.

Norton's Literary Register, for 1854, 12mo.—BY THE SAME.

Seventh Annual Report of the Smithsonian Institution for 1853.—BY THE SAME.

Literaturgeschichte der Araber, V. Band 2, abtheilung. By the Baron Von-Hammer Purgstall.—BY THE AUTHOR.

Bijdragen tot de Zool-Land en Volkenkunde von Neerlandsch Indie, Vols. I. II.—BY THE ROYAL INSTITUTE OF NETHERLANDS, INDIA.

Die Neusten Forschungen auf dem Gebiete des Buddhismus, Von A. Weber, pamphlet.—BY THE AUTHOR.

Collection des Ouvrages Orientaux. Ibn Batutah, 2 Vols. 8vo.—BY THE SOCIETE' ASIATIQUE.

Transactions of the Bombay Geographical Society, Vol. XI.—BY THE SOCIETY.

Memoirs of the Royal Astronomical Society, Vol. XXII.—BY THE SOCIETY.

Monthly Notices of the Royal Astronomical Society, Vol. XIII.—BY THE SOCIETY.

Journal of the Academy of Natural Sciences of Philadelphia, Vol. II. p. III.—BY THE ACADEMY.

Natuurkundig Tydscript voor Nederlandsch Indie. Decl VII. p. III. and IV.—BY THE EDITOR.

Quarterly Journal of the Geological Society, No. 40.—BY THE SOCIETY.

Indische Studien, Vol. III. p. I.—BY THE EDITOR.

Selections from the Records of the Madras Government, No. II.—FROM THE MADRAS GOVERNMENT.

Report on the Trade and Commerce of the British North American Colonies. By J. D. Andrews, 1 Vol. 8vo.—BY THE AUTHOR.

Collection Orientale. Le Livre des Rois, Vol. III.—BY THE FRENCH GOVT. Ruze Rondom Het Eiland Celebes von G. van der Hart.—BY THE ROYAL INSTITUTE OF LANGUAGES OF NETHERLANDS INDIA.

Banka Malakka en Billiton, Verslagen von Dr. J. H. Croockewill, 1 Vol. 8vo.—BY THE SAME.

Kitab Tochpah Javaosch Mohammedoansch Wortboek. Door Mr. S. Keiysen.—BY THE SAME.

Oriental Christian Spectator, for January, 1855.—BY THE EDITOR.

Die neuern Forschungen über das alte Indien, Von Dr. A. Weber, 12mo. pamphlet.—BY THE AUTHOR.

Journal of the Indian Archipelago and Eastern Asia, for May and June, 1854.—BY THE GOVERNMENT OF INDIA.

The Calcutta Christian Observer, for January, 1855.—BY THE EDITOR.

The Oriental Baptist, No. 97.—BY THE EDITOR.

The Upadeshak, No. 97.—BY THE EDITOR.

Address of the Right Hon'ble the Earl Rosse, President, read at the Anniversary Meeting of the Royal Society on Wednesday, November 30th, 1853.—BY THE ROYAL SOCIETY.

Proceedings of the Royal Society, for 1852.—BY THE SAME.

Philosophical Transactions, for 1852, p. II.—BY THE SAME.

Address to the Individual Members of the Board of Visitors of the Royal Observatory, Greenwich, June, 1853.—BY THE SAME.

Natural History of New York, Parts V. 3 vols. Part VI. Vol. II.—
BY THE STATE OF NEW YORK.

Notices of the Meetings of the Royal Institution, part IV.—BY THE INSTITUTION.

Purchased.

Johnson's Dictionary in Persian, Arabic and English, 1 vol. 4to.

Extract du Fukhri Traití d' Algèbre par Abu Bekr Mohammad ben Alhaçan Alkharkhi. Par F. Woepeke.

The Annals and Magazine of Natural History, No. 84.

Westergaard's Zendavesta, Vol. I. pp. i. ii. iii.

Chodzko's Grammaire Persane.

Vuller's Lexicon, Persico-Latinum, 2 parts.

Westergaard's Bundelesh.

Renan's Averroas et l' Averroisme.

Journal des Savants—for September, October and November, 1854.

Weber's White Yajur Veda, Part II. Nos. 2-3, 20 copies.

Anvar i Soheli, being the Persian version of the Fables of Bidpae. By Husain Vaiz Keshifi,

Exchanged.

The Athenæum for October and November, 1855.

Philosophical Magazine, No. 55.

FOR MARCH, 1855.

The usual monthly Meeting of the Society was held on the 7th inst. at half-past 8 p. m.

Sir JAMES COLVILE, Kt., President, in the Chair.

The President introduced to the Meeting M. M. Adolphe, Hermann and Robert Schlagintweit who have recently arrived in Calcutta (via Bombay and Madras) on their way to Nepaul and Darjeling with a view to prosecuting magnetic observations in the Himalayas. The following extracts from a letter addressed to him by Baron Humboldt were read by the President.

“ Comment ne pas s’adresser avec confiance au digne President d’une illustre Société dont les travaux ont repandu une si vive lumière sur la Géographie, l’ancienne civilisation, les monumens, l’organisation des langues de l’ Inde.

“ Les deux frères ainés Schlagintweit marchant sur les traces de Saussure, imbus de tout ce qu’ offre les progres actuels des sciences physiques, pleins de cette ardeur que le premier les a conduit à la cime de Monte Rosa ont fait paraître deux ouvrages marquans sur les Alpes de la Suisse.

“ La Société Royale de Londres, si indulgente et si bienveillante pour moi (j’ai vu la premiere fois votre belle patrie in 1790, conduit par George Forster qui avait été de la seconde Expedition du Capitaine Cook,) a fait l’insigne honueur aux jeunes voyageurs mes compatriotes de les recommander à ma prière avec chaleur à la Compagnie de l’Inde. Ils y ont été accueillis et secondés avec une généreuse faveur et munis de precieux instrumens dont l’usage leur est familier.

“ Le Souverain auquel je suis attaché de très près, et qui a une vive prédisposition pour tout ce que la nature et les souvenirs historiques offrent de grandiose dans l’ Inde a eu le premier l’idée d’une nouvelle expedition à la chaîne de l’ Himalaya ; et a trouvé dans le concours de la Compagnie de l’ Inde plus qu’il ne pouvait désirer honorant lui-même depuis plusieurs années les jeunes Docteurs Schlagintweit d’un affectueux intérêt tout personnel.

“ La chaîne de l’ Himalaya a en dans ces derniers temps de savants et intrépides observateurs, Hodgson, le Capitaine Strachey, le Docteur Thomson et celui qui réunit une grande variété de connaissances solides, mon ancien ami Joseph Hooker ; mais dans ce grand monde de votre Inde, il restera à glaner encore pendant des siècles et les changements que subissent (en progrès) des sciences physiques, surtout la Géologie des formations, présentent à de nouveaux observateurs aussi des chances nouvelles et favorables. Vieillard presque antédiluvien, assis long temps sur le rivage, j’ai assisté à ces grandes changements dans les aperçus de la physique du monde. La bienveillance avec laquelle le nom de Guillaume de Humboldt, sérieusement instruit en Sanscrit, en Malay, en Kawi, en Basque, en Madjar, en Celtique, en Chinois, en langues Américaines, paraît quelque fois dans le Journal Asiatique jette quelque reflet propice sur l’ auteur de ces lignes microscopiques et tracées à la hâte.

“ Le rêve qui m’a poursuivi depuis mon retour de Mexique, avant l’expédition de Sibérie a été aussi hélas ! le rêve d’un voyage à l’Himalaya et une partie de Tibet.

“ Veuillez bien offrir aux Membres présents de la respectable Société Asiatique l’expression de mon admiration et de la reconnaissance inspirée par le souvenir d’un frère cher.”

The proceedings of the last month were read and confirmed.

Presentations were received—

1. From Babu Radhanath Sikdar, two copies of the Mashik Patrika, Nos. 6 and 7.

2. From the Secretary of the Royal Institution of Languages, &c. of Netherlands India, the publications of the Institution.

3. From Dr. J. Grant, a small bottle containing specimens of a substance which fell in the neighbourhood of Agra for three or four days in the middle of February. The following is an extract from Dr. G.’s letter.

“ The first I heard of it was, that a shower of sugar had fallen all in and about Agra : at length while we were talking about the matter, two friends sent me specimens. The substance appears in the form of a greyish deposit upon the ground or on the foliage of trees as the case may be ; the particles having much the appearance of sand. In taste it is somewhat mawkishly sweet like manna. It

soon agglutinates into little masses which to the feel are gummy and adhesive." Dr. Maenamara of the Medical College who kindly examined the contents of the bottle says, "Under the microscope it presents grains of sand, some particles of woody fibre and a few starch granules; chemical tests show the presence of sugar and starch."

4. From the Government of Bengal through Mr. Under-Secretary Russell, a copy of the 2nd vol. of the Rig Veda Sanhitá.

5. From J. Watson, Esq. C. S. specimens of fossil stem and leaves of Cycas from the Rajmahal Hills.

The following gentlemen, duly proposed and seconded at the last meeting were balloted for and elected members.

Rájá Rádhákúnta Deva, as an Honorary Member.

D. G. Nicolson, Esq. Assistant Commissioner at Moulmein, and Rowland Hamilton, Esq. as Ordinary Members.

The following were named for ballot at the next Meeting.

W. G. Young, Esq. C. S.,—proposed by Mr. Grote and seconded by Mr. Allen.

Bábú Kalichurn Roy, Zemindar of Rungpore, proposed by Mr. Grote and seconded by Bábú Kissory Chand Mittra.

Capt. Charles Young, Bengal Engineers, proposed for re-election by Dr. Macrae and seconded by Mr. Grote.

Communications were received—

1. From H. Piddington, Esq. communicating some observations on a Forest Race (Vedah?) with extracts from a letter by Capt. Oakes on the ruins of Dhoolmi in Singbhoom.

2. From Captain Saxton, announcing despatch of specimens of coal and of iron ore from the Gungpur Rájá's territory. The following is an extract from Capt. Saxton's letter.

"I have this day dispatched by Banghy Dák, under official frank, a packet, containing specimens of coal taken by me from an extensive bed in the Gangpur Rájá's territory, some 50 or 60 miles N. W. from Sumbhulpur. With the coal are also specimens of other substances found in the same locality, in immediate contact with the coal. I shall be much obliged, if I can be furnished with a report on the testing of these specimens, to make use of in my professional reports. I have also enclosed a specimen of iron stone,

which is abundant on the Western side of a range of hills not far from the coal bed. Iron stone is found in great abundance all over these districts, but I thought these specimens might be interesting, as containing fossil remains well shewn.

"Should this coal be found of value, it might I think be made available. The nearest point of the Mahanuddy would be 'Pud-dumpore,' from which the coal bed lies about twenty-five to thirty miles North. At present the country surrounding, is wild jungle with only a very few small villages of half a dozen houses, within ten miles on all sides. The country is however, capable of being brought under extensive cultivation. Should Calcutta and Bombay be hereafter connected by Railway, this coal would lie on the way. The bed appears very extensive, a nullah running into Ebé River (which joins the Mahanuddy about ten miles above Sumbhulpur) passes over and through it, and masses of the upper coal which is very light are floated down the nullah during the rains. From this, it was known that coal existed, and I learnt of it from Mr. William Campbell from Sumbhulpur, whom I accidentally met. This induced me to arrange my other duties, so as to admit of my visiting the place. The coal is in places exposed on the upper surface, and at others the small water-courses of one or two feet deep running into the nullah, expose it. I walked some distance up the nullah and found the bed continuous, and a mile or more below where one path crossed the nullah, the coal was there in abundance, underneath a stratum of sandstone, and exposed on the surface on the bank. The weather was most unfavourable, and obliged me to hurry over my visit, or I should have made a more careful examination of the place."

3. From W. H. Smith, Esq. Foreign Secretary to the Royal Society of London, acknowledging receipt of the Journal, Nos. 1 to 4.

The Curator in the Zoological Department and Librarian submitted reports of additions made to their Departments, since the last meeting.

After the close of the Ordinary business, M. Herman Schlagintweit in behalf of himself and brothers presented to the Society an electro-type model of Monte Rosa and explained to the meeting the process by which they had surveyed it in 1851, and the prin-

ciple on which they had prepared their model. He, at the same time exhibited some daguerreotypes of the glaciers and drawings of the mountain.

Report of Curator, Zoological Department, for March Meeting.

The following donations have been received during the past month.

1. Capt. Berdmore, Schwei Gyen, Pegu. Another collection of sundries, sent chiefly in spirit.

Of mammalia, TUPAIA FERRUGINEA (var. *peguana*) ; SOREX NUDIFES, nobis, (p. 34, *ante*) , 2 specimens; SCIUROPTERA SAGITTA* (?) ; and RHIZOMYS CASTANEUS, nobis, J. A. S. XII, 1070, previously received only from Arakan.

Of birds, a skin of HALIASTUR INDUS, and entire specimen in spirit of ATHENE CUCULOIDES.

Of reptiles, HYDROSATRUS SALVATOR (*v. Varanus bivittatus*, D. and B.); PTYCHOZOON HOMOLOCEPHALON; DRACO MACULATUS; LEIOLEPIS REEVESII; XENOPELTIS UNICOLOR; LYCODON AULICUS; XENODON PURPURASCENS; DIPSAS MULTIMACULATA; TROPIDONOTUS UMBRATUS; TR. SUBMINIATUS; HOMOLOPSIS ENHYDRIS (very fine); H. SEMIZONATA, *n. s.*;† POLYPEDATES LEUCOMYSTAX; P. (?) MARMORATUS, *n.*

* Dimensions of an adult male in spirit: nose to tail, 6½ in.; tail without hair, 5 in.: hind-foot, 1½ in.

† HOMOLOPSIS SEMIZONATA, nobis. This remarkably fine species has not a little the aspect of a Viper, from the small size of its scales, the subdivision of its head-plates, and the general colouring. Form moderately thick; the body with 39 rows of small strongly carinated scales. Vertical plate transversely divided into two; the anterior portion triangular, with apex to the front; the posterior semi-circular: and behind the latter is a remarkable range of five small plates, the medial being elongated backward between the occipitals, and posterior to this again is a minute inter-occipital: occipitals curiously scalloped each with three incisions; one posterior, one exterior, and one interior: two pairs of frontals; a frænal; and a post-nasal. Colour pale yellowish-brown, marked on the upper-parts with about 36 semi-annuli, which are of a blackish hue on the edges, paler within: on the hinder part of the body and tail are some black spots on the pale inter-spaces; and a medial black streak from the occiput is continued to the second transverse semi-annulus: a triangular black spot on the snout; also a blackish eye-streak; and small spots on each occipital: lower-parts with two irregular rows of dark spots from throat to vent, bordering the scutæ; and the sub-caudal scutellæ are marked throughout with black. Number of scutæ, 168; scutellæ, 78 pairs. Length of specimen 27 in., of which tail 6 in. It is remarkable that the abdo-

s.; * *RANA VITTIGERA*; *HYLÆDACTYLUS BIVITTATUS*, Cantor (measuring 3½ in. over curve of back, from snout to vent; knee to end of longest toe, 3½ in.); and *BUFO MELANOSTICTUS*.

2. J. C. Parker, Esq. Skin of *SPALAX TYPHLOPS*, (Pallas). The animal was found lying dead upon the summit of a heap of sand, in the vicinity of Beyrouth.

3. T. C. Jerdon, Esq. Skin of *SAXICOLA FUSCA*, nobis, *J. A. S.* XX, 523.†

4. J. B. Lawson, Esq. Skull of *TETRACEROS QUADRICORNIS*.

5. J. Hodges, Esq. A few marine shells, picked up at Suez.

6. From myself. Specimens of *ACHATINA BICARINATA*, and of reversed *AMPULLARIA* and *PALUDINA* from Madagascar.

LIBRARY.

The library has received the following accessions during the last month.

Presented.

The Rig Veda Sanhita, Vol. II. Edited by Dr. Max Müller, 1 vol. 4to.—**BY THE GOVERNMENT OF BENGAL.**

Notulae ad Plantas Asiaticas, Part IV. Dicotyledonous Plants. By the late Dr. Griffith, 8vo. 2 copies.—**BY THE SAME.**

Icones Plantarum Asiaticarum, Part IV. Dicotyledonous Plants. By the late Dr. Griffith, 2 copies.—**BY THE SAME.**

Oldham's Geology of the Khasi Hills, 1 vol. 4to. 2 copies.—**BY THE SAME.**

The Ganges Canal, in Bengali, folio pamphlet.—**BY THE SAME.**

Selection from the Records of Government, N. W. P. Part XVIII.—**BY THE GOVERNMENT OF THE N. W. P.**

minal scutæ begin to divide obliquely as they approach the vent, the last two or three assuming the appearance of pairs of scutellæ.

N. B.—The *H. crassa*, nobis, *J. A. S.* XXIII, 300, appears to be identical with *H. REINWARDTII*, Schlegel, from Louisiana: but *H. PARVICERPS*, nobis, *ibid.*, we are still unable to identify with any previously described species.

* *POLYPEDATES (?) MARMORATUS*, nobis. Hind-feet completely webbed. Tympana very small. Skin granulose above and on the belly. Colour black above, marbled with dull leaden-grey; below sullied white, more or less marbled with dusky on the throat and breast. Length 2½ in. from snout to vent: hind-limb, 4½ in.

† Described from the fragments of a specimen. A typical Wheatear. Colour fuscous, tinged with fawn on the back, and more brightly on the forehead and under-parts. Tail darkest, and without any white upon it.

Ditto from Public Correspondence of the Punjab Administration, No. X. 4 copies.—BY THE SAME.

The Mashik Patriká, Nos. 6 and 7, 2 copies.—BY BA'BU RA'DHA'NA'TH SIKDÁR.

The Oriental Christian Spectator, for Feby. 1855.—BY THE EDITOR.

Proceedings of the Royal Asiatic Society, No. 7.—BY THE SOCIETY.

The Tatwabodhini Patriká, No. 138.—BY THE EDITOR.

The Dúrbín (Persian newspaper) for Feby. 1855.—BY THE EDITOR.

The Citizen Newspaper, for ditto.—BY THE SAME.

RA'JENDRALA'L MITTRA.

March 2nd, 1855.



JOURNAL
OF THE
ASIATIC SOCIETY.

No. III.—1855.

Report on the Kooloo Iron Mines and on a portion of the Mannikurn valley.—By M. MARCADIEU. (Communicated by the Government of India.)*

Before my arrival in Kooloo, the information I had received of the mineral resources that this country appeared to offer, embraced nothing of its iron mines ; their existence was completely unknown. The information was confined to the fabulous recitals of the Mannikurn thermal waters, and to the existence of sulphurets of iron and lead within this same valley. Arrived on the spot, at the first sight of a rock from Futeepore, I saw directly, and ascertained by experiments, that it contained magnetic oxide of iron. This fact acquired, led me to the examination of the soil, which entirely confirmed it.

A second mine of oligist iron, was discovered thus ; while conversing with Captain Hay on the probability of meeting with oligist iron in the quartz mountains in the vicinity of the thermal springs of Mannikurn, it occurred to him, to make use of his just authority to question the natives. The influence that he exercises over them, led to the best results, for one of them soon brought us a block of badly smelted iron and some specimens of the mineral metal, extracted clandestinely from a neighbouring mountain.

The first of these mines, the magnetic iron ore, is situated near

* Some pains have been taken to improve the composition of this report, which should rather have been drawn up in French and then translated. Occasionally passages have been omitted where there were doubts of the writer's meaning.—ED.

Futteepore, South west of Sultanpore, facing the village of Quageah, and the road from Kooloo to Simla. The mountain containing this mine, is called by the natives, Jilly Pronally. It belongs to the chain extending from East to West, and is bounded at its summit, by a table-land adjoining the mines and the possessions of Mundee. It is a large ravine serving as a pass, leading to the villages of the table-land, and owing most likely, its enlargement to the erosion of pluvial waters. The rock in which the grains of magnetic oxide of iron are embedded is a mica schist of the same nature as the mines already described in my first reports.

It is to be remarked that the blackest lines of stratification, that is to say, those containing the grains of oxide of iron, generally contain less mica, than those of a lighter colour, and that the rock passes as it were to the grey wacke. To the left, on ascending this ferruginous ravine, the mica schist which borders it, contains no iron.

It would appear that the mineral extends under the table-land, in a line perpendicular to the mountain, inclining however to the right, the only part exposed at about thirty feet from the summit, seems to run in that direction. The existence of this mine was completely unknown to Europeans, though worked by the Natives of the neighbouring villages for a length of time. Though the country is well wooded, this work is limited to four small furnaces, similar to those of Mundee and elsewhere. This mine, in its physical character, as well as in its composition, exactly resembles all the magnetic iron mines described in my former reports; it contains from 10 to 15 per cent. of magnetic oxide of iron. In its natural state this mine is poor, but the ease with which the oxide of iron can be separated from the rock, places it in the same category as the mine I have already described.

The oligist iron mine is situated in a mountain of quartz bordering the left side of the torrent Parbutty, facing the thermal springs, but on the Southern slope opposite the Mannikurn valley. Owing to the impossibility of reaching the mine from this side, on account of the steepness of the mountain, Captain Hay, myself and the guide, retraced our steps to the village of Deah, picturesquely situated on the summit of a mountain facing Bijowrah. We started thence to make a fresh excursion, but on arriving at a certain

distance from the mine, insurmountable difficulties presented themselves, the rapid declivities which we had to ascend and descend rendering it impossible for us to reach the bed of this ferruginous deposit, to study its extent. Natives on the contrary, circulate in these dangerous places with surprising facility ; the most intelligent of my servants after having received my orders repaired to the spot, in company with guides, who work a little of this iron. They brought me back specimens of the mineral, part of which has been sent to the Chief Commissioner, and they repeated to me that which I had already learnt from a Native, that the iron was extracted from a vast cavern, and that it existed in streaks of great thickness, alternant with quartz. It must not be thought, that the obstacles which prevented us from reaching this mine are difficult to overcome, for a road could easily be made which would render access to it easy, and I am convinced, that orders to that effect will soon be given by the Commissioner of the Kangra District, it being important that the question connected with the development of ferruginous resources should be seriously taken up. This oligist iron mine promises by its position in a well wooded country, to furnish largely to those resources. Let the distance of about 200 miles, from Kangra to Kote Kaei be surveyed, that is to say, the range of mountains in which is found the mineral of magnetic iron, what fuel is there to be met with ? A few trees scattered here and there, scarcely sufficient for the manufacture of a few pounds of iron daily ; it is a fact, nothing or nearly nothing is to be met with ; whilst in the greater portion of the Kooloo district, a rich vegetation exhibits itself. It is then in Kooloo, that I propose establishing iron works, on a large scale, and I would there collect the produce of the neighbouring mines of Nolata, Core, Durmany, Surmany, and Currany, they are all in the Kangra district, and in the vicinity of Kooloo, and if necessary, a call could be made on the Mundee mines. One question only remains to be solved ; that is, to ascertain if the Natives of the five villages just mentioned can communicate with Kooloo, without passing over the old road of Harabagh, &c. and to find out if the mountains to the East, which separate these two localities would permit of a road being made. This enquiry belongs to the Engineer's

department and could be made in a very short time. If, as I believe, this opening is practicable, the transport of the magnetic oxide of iron from the five villages could be speedily performed on beasts of burden, and we should then have obtained all the conditions necessary for the success of this project.

Bijowrah struck me as being the most suitable spot to establish the building for the reduction of the iron ores. Its position is not only centrical to the mines and the fuel supplies, but presents the double advantage of being on the direct road to the plains via Kangra and Noorpoor : having close at hand a watercourse, with proximity to the Bias to increase the motive power if required.

The forest to the East, and the magnetic iron mine situated in the same direction are at about twenty miles from Bijowrah ; the oligist iron mine as well as its neighbouring forests, at about the same distance ; and the Northern forest from twenty to twenty-five miles.

Such being their situations Bijowrah offers the nearest central spot, both to the mines, and to the fuel, and is the most convenient for the transport of the manufactured iron. The pine preponderates generally in these forests, but in the hills to the East, the oak is found in rather large abundance. Far be from me the idea of exaggerating the resources of the Kooloo forests. I have on the contrary been very moderate in my expressions, because I am anxious that Captain Hay, who is in charge of the district, as well as the topographic work compiled by Major Longden, of Kooloo, should be consulted on the subject. I repeat it, in the part of the Himalayás that I am acquainted with, Kooloo is the only spot capable of supplying fuel to works of any importance, but we must not conceal the fact, that mountainous countries are far from presenting on this subject the same facility as the plains ; the construction of roads is more difficult, the distances to go over more laborious, and often longer, and consequently the transport of materials, more expensive.

But where in the actual state of things, can we find any thing better for present wants ? We must then submit to the necessity of position, and consider it very fortunate to foresee the possibility of erecting a useful establishment, in a country situated in the

vicinity of other districts unprovided with fuel. In one word, it is already something to be able to enter into the limits of the possible in this part of India, it is even a great deal; but to be successful, there are conditions to fulfil, which must not be lost sight of. These conditions consist in the art of making charcoal.

At first sight the carbonization of wood seems so easy an operation, that the most limited intellects can direct it, following the old system of routine, established by the vulgar. These ideas have been the cause of many errors, and of failure in many industrial enterprizes. It is indispensable that, in this country especially, where the scarcity of wood, fit for the manufacture of charcoal, is sensibly felt, we should endeavour with care, to bring into use the perfected operations that science can furnish to increase a production, so necessary to industry; but to succeed in this manufacture, it would be necessary that the direction be entrusted to a European, who should have acquired by experience the knowledge, theoretic and practical, of the art; the advantages resulting from such a rational direction would be, as I will prove, of the greatest importance.

The wood for carbonization, the most generally distributed over this country, is the pine. It is then on this wood that I am going to establish the comparative results furnished by experiments, which are equally applicable to the oak. The experiment which has been taken as a starting point for the improvement of the manufacture of charcoal, consists in the determination of the quantity of carbon which 100 parts of wood simply dried in the air contain.

It resulted from this experiment that the mean of this quantity was 28 parts: this datum compared with the results obtained by the ordinary defective means, of which the average quantity was only 15 to 16 per cent., impressed on the mind the importance of finding means for improving the process, and enlightened by previous experiments, performed on small proportions, we arrived by the help of simple modifications, founded principally on the manner of conducting the combustion, to obtain from 25 to 31 of charcoal. In practice that is the highest number attainable, and the number 31 can only be obtained by an intelligent superintendence, during the whole time of the operation. These are the

results of the produce of three qualities of pine growing in the different parts of Europe.

Pinus picea.	} Dried in the air, consequently having lost 5 to 6 per cent. of water.
Pinus abies.	
Pinus silvestris.	

The mean by the defective process, is 13 to 14 per cent. By the improved process 26 to 28 ; I hold it essential to set forth this enormous difference to prove the importance of endeavouring to obtain the maximum in this country, for the difference is nearly double, and consequently from the same quantity of wood, a double quantity of iron could be obtained. These advantages would be of the greatest importance, in an economical point of view, and consequently require the strictest attention on the part of Government. It is the more necessary to try and attain them, with this firm conviction that success is assured by complying with the rules prescribed by experience and observation.

If by chance the person charged with the direction of these practical works had not a knowledge of some of these improvements, I would with pleasure furnish all the information he might wish for, on the subject, as well as the plans, connected with the work.

Kooloo is an interesting country, worthy of a serious study for many other things, throughout the whole of its extent. The existence of sulphurets of copper, lead and iron, in different places of a district, is often the foreteller of interior metallic deposits, sometimes rich, and sometimes poor. These characteristic signs never escape the European mountaineers who make a profession of mine-seeking ; they call these sulphurets, *flowers*. When they fall in with any during their laborious excursions, they attack the soil with that ardour, that is inspired by the hopes of success, and it must be granted that if the works of these intrepid men are often unsuccessful, it is just also to say that sometimes they derive from them the finest results. Certain parts of Kooloo are precisely in the position to excite the courage of the mine-seekers of Europe, the *flowers* appearing as a certain pledge of success, but we should never in these investigations go beyond the limits of prudence. The valley of Munnikurn offers examples of these indications, which

have at different times roused the cupidity of the natives of this country, but the superficial excavations made without intelligence, have always been unfruitful. In the ravine of Jury near Roupie on the left bank of the Parbutty, the sulphuret of lead forming nests in a compact quartz more or less translucid, resting on the mica schist, is found nearly on the surface of the left slope of the ravine, on a limited extent of about 15 feet, and at some distance thence a few blocks of quartz are occasionally met with, containing sulphuret of iron. As it appears exposed on the soil, this sulphuret of lead presents no real material interest, but they are *flowers* placed in evidence as a characteristic sign, often deceitful, of mineral wealth buried at a certain depth. This quartzose is met with in large quantities, in the extremity of the same valley near the village of Honchide, on the right bank of the Parbutty. A gallery made some time ago by the natives, allows you to penetrate to about 25 feet into the interior of the mountain.

It is said that during the reign of the Seikhs, they worked this mine as argentiferous, but in this, there can be no truth, for the specimens I examined and analysed did not furnish the slightest trace of this metal and, besides, the natives would never have forsaken it, had they been sure of finding silver. It is more probable that these defective works have been undertaken in the hopes that the sulphuret of iron, of a seducing appearance, would lead to the discovery of a precious metal, and that they have been forsaken, because the natives were ignorant of the means of following up these researches without danger. There exist in other parts of Kooloo sulphurets of copper, that it would be important to examine; I had not time to visit these localities, because the orders to start for Pongah only left me a short time to examine rapidly the most interesting parts of the Munnikurn valley. It is essential to examine and ascertain the industrial value of these copper mines, for if rich, they might be joined to the iron works of Kooloo.

There remains now to speak of the Thermal springs of Munnikurn, that have been so falsely praised for their medical virtues. This spring is in the transversal valley of Munnikurn, situated in a direction East to West at about 20 miles from the lateral valley through which flows the Bias. It issues in an enormous volume

through the fissures of the mica schist, upon which repose a few quartz rocks. The hottest of the springs are the nearest to the right bank of the Parbutty in the village of Munnikurn.

There are several springs close to one another, occupying a space of about 30 feet, the principal basin, the one furnishing the greatest abundance of water, forming nearly a circle of about three to four feet in diameter, the sides of which are covered with a deposit of ferruginous travertine, in appearance, something like a cauliflower.

The water from this basin issues through the fissures of the rocks with a violent bubbling, accompanied with a deafening noise produced by the escape of a considerable quantity of aqueous vapour, depositing at the same time on the surface the calcareous concretions just mentioned, which it brings from the bowels of the earth. There are also disengagements of gas, of which I could not determine the nature, not having the graduated instruments necessary to collect it, nor the reagents indispensable for these sorts of pneumatic operations, but I will fill this gap as soon as I possibly can, not only on this water, but on all those which I have examined or may analyse hereafter, being well aware, that the determinating gas contained in mineral waters in general, is the necessary complement to the work.

The temperature of the principal basin, taken several times was 202° Faht. that of the air being 63° Faht. The coincidence existing between this temperature and the point of ebullition which is also 202°, is very remarkable. There results then from this similarity, that with the temperature of the water from the basin, in case of need, the elevation of the spot from which the water issues can be taken; for the water of the source is really in a state of ebullition. The elevation taken on the 1st of May, 1854, at $\frac{1}{2}$ past 9 A. M. was 5,705 feet above sea level. When this elevation is compared with the ascensional distance that the thermal waters are obliged to flow over to arrive from the depth of the earth where it is heated, to the surface of the soil, (a distance taken from the law of increasing temperature in proportion as we penetrate into the interior of the earth in a vertical direction,) we come to the consequence, that the distance gone over by the liquid is at least 7,911 feet, that is 2,206

feet beneath the level of the sea. This depth must be still greater, but the mean temperature of the village of Munnikurn not being known, I was obliged to take for a starting point 63° Faht. which is certainly too high. This reminds me how important it would be, to determine, in the different parts of India, the line of invariable temperature of the earth; we should then have the mean temperature of places without being obliged to perform long and tedious thermometric experiments, which cannot always be performed with exactitude every where, and we should equally be able to obtain more accurate notions of the nature of the climate and vegetation. I am well aware that the mean temperature of such localities as have been inhabited for a length of time by Europeans is well known, but it is seldom that those localities offer the scientific interest met with in isolated places, in mountainous countries for example, which are only occasionally visited, and in which, for that reason, a long series of thermometrical observations can rarely be taken.

It results from observations made in Europe and America, that the invariable line of temperature increases in depth, as we approach the poles, and that it diminishes as we increase the distance from them. In the temperate climate of Europe, it varies between 79 and 89 feet beneath the surface of the earth, whilst under the tropics the larger invariable is found at 13 inches. These data lead us to conclude, that in India we should not have to excavate to any great depth to find the larger invariable, showing the mean temperature.

The thermal springs of Munnikurn, though they belong to the class of the warmest met with in nature, do not however reach the highest degree of temperature known. In fact, the heat of 202° is exceeded by many other springs, and to give two examples, I will name those of Camarguillas in Mexico indicating 205.5, and those of Las Teruncheras, the temperature of which has increased within the last 24 to 25 years from 194.5 to 206.6, Faht. Two facts characterise the thermal springs of high temperature; 1st, their purity, that is to say, the minimum portions of mineral substances which they contain; 2nd, the variability of their temperature. I am not aware, if the waters of Munnikurn have or have not under-

gone any change in their temperature, observations being deficient on the subject, but it is positive that, in their actual state, they are in a medical point of view unimportant. 10,000 parts of this water contain only 3-2 of saline substance composed of chloride of sodium, sulphate of soda, chloride of calcium and carbonate of lime. A simple evaporation followed by calcination, with the weight of the produce, is sufficient to show, that with the exception of their temperature, these waters differ little from ordinary drinking water. It is nearly the same with the springs of Beshist and Ketat, of which I analysed the waters. These two springs are in the large lateral valley of Kooloo, the first on the left bank of the Bias, temperature 117°, the second on the right bank, at about 10 miles from the first, temperature 102°. Both issue from the mica schist. These springs contain the same salts, as that of Munnikurn, but in different proportions. That of Beshist furnished in 10,000 parts, 7 of saline matter, that of Ketat, also in 10,000 parts, furnished 8.

Though these proportions are larger than in the Munnikurn waters, they are not sufficiently large to entitle the springs to the denomination of medical mineral waters; it is to be remarked that they only belong to the class of saline springs, no gas communicating to them any striking properties. The Ketat spring contains a substance of an animalized odour, which gives to the residue from evaporation a very characteristic shiny appearance. We thus see that the properties of the thermal sources of Kooloo are reduced to the salutary effects of hot baths.

This reality is however not appreciated by the natives of Kooloo, especially as regards those of Munnikurn, which they consider to possess supernatural virtues. It is true that the abundance and high temperature of this source as well as the considerable quantity of vapour discharged with noise from this burning furnace, is calculated to impress deeply the mind of these people naturally disposed to superstition. The Kooloo population is gifted by nature with intellectual advantages which are not so conspicuous elsewhere in this neighbourhood—regularity of features, a projecting forehead, and an open facial angle characterise the natives of this privileged country. The decided taste they have for flowers, with

which they ornament their heads, with an elegance truly remarkable, give to the frequent assemblies of their rural merry-makings, that character of simplicity and artless coquetry, which brings to the mind the language of the heart of the bucolies of Virgil and of the Idylles of Theocritus.

Independently of the principal spring of Munnikurn, there exist many others over an area of about $\frac{1}{4}$ of a mile, the whole length of the village. Their temperature is not so high, because they mix with neighbouring cold streams. The natives have taken advantage of this circumstance to construct baths, the keeping of which is entrusted to people who praise the curative virtues of the water with the prophetic language of true believers; this preamble of praises is addressed with still more fervour to European travellers to invite them to bathe first, and then to obtain a gratification, the largest possible, but there, as elsewhere, we may write in large letters this philosophical maxim, " Jamais la rénommée ne se reduit à la vérité."

When we fix our attention on the creation of this vast silicious deposit, bordering the two sides of the Parbutty, in the Munnikurn valley, and especially its right side, where the hot springs are, we must admit that a powerful chemical action has been in force during this deposit, and that action can only be attributed to the mineral waters, which appear to have played an important part at a time when their temperature was much higher than it is at present, and their volume much more considerable. At present it is no longer the same; we have but a weak manifestation of an action, which has been at some distant period of great power: the waters in a length of time leave but a thin and limited bed of carbonate of lime. However the brilliant researches made in Europe in the case of deposits of different ages made by the same spring, have proved in the most evident manner, that the mineral waters had changed their nature several times, and that they had at one time abundantly deposited substances, which at present they no longer contain. The theory of these researches founded on facts, is in all probability, applicable to the Munnikurn thermal springs: the silicious deposit would have been its first work, which has been succeeded by the limited deposit of ferruginous travertine of the present

epoch. But between these deposits, there exist perhaps intermediate ones, and on this subject I proposed making researches as well as into the dip and direction of the quartz, when the order to start for Thibet prevented me.

In the valley of Munnikurn there are three qualities of quartz—1st, quartz compact with a fissure slightly scaly and translucent, in layers subordinate to the mica schist. 2ndly, the compact granular quartz more or less opaque, with a schistoid texture, containing globules of mica disseminated and mingled, as it were, with the mass. 3rdly, the mica granular quartz, which extends in a more constant manner on the right banks of the torrent, in a north-westerly direction for a distance of more than 10 miles, from the thermal springs, showing at rare intervals a few layers of mica schist. This rock prevails over all others of the same nature, and is so friable, that the frequent landslips give to this part of the valley, an appearance of disorder and sterility that saddens the observer. All leads to believe that this deposit of quartz reposes on the mica schist. Erosions caused by the waters have uncovered, in the lower part of the valley, layers of mica schist in a perfectly horizontal position. The mica is not seen in an uniform manner throughout this vast deposit of quartz; we fell in with series of rocks, that contained only small portions scarcely visible with the magnifying glass, and had the aspect of quartzite or quartfels. If the Kooloo district is interesting, in a Geological point of view, we have seen that it is not so in a medical sense, as far as the mineral waters are concerned.

Note on the Limboo Alphabet of the Sikkim Himalaya.—By DR. A. CAMPBELL, Darjiling.

Lieut. George Mainwaring, of the 16th Regt. N. I., (Grenadiers) who has applied himself very sedulously to the acquirement of the Lepcha language, as well as the Thibetan, favoured me, a short time ago, with the annexed copy of the Alphabet of the language of the Limboos, a numerous tribe, inhabiting the eastern

ရိ၁ Kim	၃၁ Kum	၂၁ Kōm	၃၃ Kyāk	၃၃ Kyēk	၃၃ Kyēk		
၂၁ Kōm	၃၁ Kaim	.	၃၃ Kyih	၂၃ Kyuk	၃၃ Kyōk		
၃၀ Kāng	၃၀ Kēng	၂၀ Kēng	၃၃ Kyōk	၃၃ Kyāk	.		
၃၀ King	၃၀ Kung	၂၀ Kōng	၃၃, Kyāk &c. and so on with the remaining finals..				
၂၀ Kong	၃၀ Kaing	.	၃၃ Kara	၃၃ Kere	၃၃ Kere		
၃၂ Kaing	၃၂ Kēng	၂၂ Kēng	၃၃ Kiri	၃၃ Kuru	၃၃ Kōro		
၃၂ King	၃၂ Kung	၂၂ Kōng	၃၃ Kōro	၃၃ Kairai	.		
၂၂ Kōng	၃၂ Kaing	.	၃၃ Karāk	၃၃ Kērek	၃၃ Kērāk		
၃၂ Kal	၃၂ Kel	၂၂ Kel	၃၃ Kirik	၃၃ Kuruk	၃၃ Kōrok		
၃၂ Kil	၃၂ Kul	၂၂ Kōl	၃၃ Kōrok	၃၃ Kairai	.		
၂၂ Kōl	၃၂ Kail	.	၃၃ Karāk	၃၃ Kērek.	၃၃ Kērāk.		
၃၄ Kap	၃၄ Kēp	၂၄ Kēp	၃၃ Karāk ၃၃ Kērek. &c. etc.				
၃၄ Kip	၃၄ Kup	၂၄ Kōp	၃၃ Kōrok				
၃၄ Kōp	၃၄ Kaip	.	၃၃ Kairai	.	.		
In like manner with ၃၁ a. and the rest of the Conso- nants.			၃၃ Can take no final after it.	○ Placed over a letter gives it an acute accent, as ၃၃ ki			
၃၃ Kya	၃၃ Kyē	၂၃ Kyē	6 Is sounded long it is me- rely a prolonged final note to the reading chant.				
၃၃ Kyi	၃၃ Kyu	၂၃ Kyō	11 Is the colon stop.				
၃၃ Kyō	၃၃ Kyai	.	LITH. BY T. BLACK ASIATIC LIBRARY PRESS, CALCUTTA.				

*The Timbo, or Yakhung ba
Language consists of Twenty*

Eight Letters viz. nineteen consonants, and nine vowels, which are as follow.

Consonants

Ka Ba Ma Ta Ya

2 4 8 3

Tha Ra Sha Nga Sa

31 3 9 3 6

117 55 3 T PI

11 2 11 21 61

Kha Ra Chat Huu

四 章 B 82

Foreword

a ē ī ū ō ū ai
ଅ ଏ ଇ ଉ ଓ ଉ ଏଇ

There are also Seven

Finals

-z ak -, ak - am

-o āng -ō āng -u ah
-u ap.

Similar with the Tibetan
and Lepcha this language
has also a "ya x Ba" affixed

thus

\rightarrow ya \leftarrow Ra

The vowels, Finals and ya

& Ra are thus affixed to the
Letters.

Z Kaz Ke Z Ke Z Ki

କିଳୁ କୁଳାଳୁ

Kai

33 Kák 33 Kék 32 Kék

କିକ୍ କୁକ୍ କୋକ୍

କୁଳକାଳୀ

ꝝ Kāk ꝝ Kēk ꝝ Kēk

$\exists Kik$, $\exists K\bar{u}k$, $\exists K\bar{o}k$

79 Kēk 80 Kāik

— १८ —

portion of the Nipal Himalaya. Many of them have in late years migrated into the Darjiling territory ; and there are a few of them settled in Sikkim.

It was from one of the tribe in the neighbourhood of Darjiling that Lieut. M. procured, or rather compiled, the Alphabet. I had mentioned to him, that it was very desirable to procure some written specimens of this language ; and fortunately, I think, he has succeeded in doing so. Mr. M. possesses a small book in the Limboo character.*

The Limboo language is now practically extinct as a written one. The character is not used now—or very rarely indeed—and the small book procured by Lieut. Mainwaring is the first example I have seen, after many years endeavouring to procure one for the Society. Many years ago, I brought the existence of this language to the notice of the Society : (see Journal for 1843) and I was at that time promised an extended detail of its gradual disappearance ; but Ilam Singh, the late Dewan of the Sikkim Raja, who made me the promise and who was himself a Limboo, and well qualified to do so, died soon after.

Observations on the Graphite or Plumbago of Kumaon and of Travancore.—By Dr. ROYLE, F. R. S. Communicated by the Government of India.

Specimens of Graphite and Plumbago have, on various occasions, been sent from different parts of India and a desire expressed to have their value ascertained in this country.

Thus at the exhibition of 1851, there were specimens from Almorah, Vizagapatam, and Travancore.

The specimens from Travancore are in nodules, extremely soft but brilliant, very like the Ceylon Graphite, of which some quantity has, for some time, been imported and sold for about £8 to £10 a ton. Some of the purer specimens of Travancore would rank

* See Proceedings for May when this book was exhibited at a meeting.

with them, but all impurity greatly deteriorates its value: the Vizagapatam in its present state, seems to be worthless.

Graphite has on several occasions been sent from Almorah as in 1849 and 1850; again in 1851, and lastly on the present occasion. It was first discovered by Captain Herbert near Almorah, who describes cutting it into slices, of which he made pencils, shewing that it had some of the qualities required in that substance. The specimens sent in 1849 and 1850 were examined and reported on by the late Mr. Phillips and also by the late Mr. Brockenden, the latter of whom was well acquainted with the practical uses and commercial value of Graphite, but he pronounced the specimens, for any purpose that he was acquainted with, as useless, and therefore worthless. The same opinion was again given to me by Mr. Brockenden before his death.

If the enormous value (from 30s. to 50s. a pound) of good Graphite, is considered, the declared worthlessness of these Indian specimens seems to be unaccountable. It is desirable to ascertain what constitutes the value of good Graphite, and what causes the deterioration of that from India. For this purpose, it is necessary to notice the different uses to which this substance is applied. These are 1st for making pencils, 2nd to diminish the friction of machinery, 3rd to make fire-proof crucibles, 4th to *black lead* grates as it is called. For all these purposes, except the last, it is evident that purity is essential.

I. The best pencils were formerly made of the Borrowdale Graphite, obtained from a mine which is now exhausted. This kind was pure and compact, and sold readily at about 40s. a pound. It was sawn into thin slices, these were inserted into the groove of one half of cedar pencils and the superfluous part filed off, then the other half was glued on to the filled up half of the pencil. It is evident that for such a purpose only the purest specimens were of any value, for the presence of a bit of quartz or of an ore of iron, or of any other metal, would injure the tools and fracture the thin slices or slender prisms of Graphite, and if they did not produce any of these effects, they would be very inconvenient at the point of a pencil for whatever purpose employed. Indeed if it had not been for the discovery that finely powdered Graphite can by an extreme

degree of pressure be rendered nearly as compact as the best natural Graphite, we should have been without any more good drawing pencils. But the Graphite for grinding, though in small pieces, must be pure, or otherwise the grinding mills become injured, besides pencils made with it, being unfit for use.

2 & 3. So also finely powdered Graphite is required for mixing with fatty substances in order to diminish the friction of machinery. It is equally evident, that this must be of the purest kind, or otherwise the machinery in which it was prepared, or that to which it was applied, would be equally injured. Thus also if Graphite, as an infusible substance, is required for mixing with the more infusible kinds of clay for making the best crucibles, the Graphite must be without impurities, as these would diminish the melting point and render the crucibles useless.

4. The Graphite or Plumbago black-lead as it is commonly called and used for polishing grates, is an impure substance, but if it has sufficient lustre it may be applied to such a purpose; it is however always a low-priced article.

Notwithstanding the unfavourable opinion entertained, by Mr. Brockenden, of the Graphite from Kumaon, I again submitted to him the specimens sent to the Exhibition of 1851 as well as those which had been forwarded from Travancore. He considered both as valueless, so Messrs. Reeves, whose opinion I likewise asked, accounted them "quite useless for the manufacture of black-lead pencils." Messrs. Wolff of Church Street, Spital Fields who also make pencils by first grinding and then condensing Graphite, took a more favourable view of the specimens, inasmuch as they could not conceive why pure specimens should not be found in the localities where both kinds had been collected. But they also observed, that they could not use the specimens in the state in which they had been sent, without damaging their machinery, and it would take time and labour, costing of course a good deal of money in this country, to separate the purer specimens from those which were intermixed with quartz or ores of iron.

Among the Travancore specimens, however, Messrs. Wolff observe, many are sufficiently pure for use, and if these were picked out in India and sent separated from the pieces covered and inter-

mixed with quartz or iron ore, there is no doubt, that it would sell in the markets for at least £8 or £10 a ton, according to its purity, and perhaps higher. As Trevandrum, near to which the Plumbago is found, is in the vicinity of the sea and near a port like Cochin, there would be very little expense in land-carriage, and therefore freight would be the chief charge, but this might not be high, as Plumbago is sometimes sent as ballast.

With regard to the Graphite from near Kumaon, Messrs. Wolff state, like Mr. Brockenden, that they cannot use it in the state in which it is sent, in consequence of the quartzy sand and iron ore with which it seems to be intermixed. But from the internal purity of some of the Graphite in nodules, as well as from the appearance of the larger specimens, they conceive that pure specimens of compact Graphite should be found in the same locality. But of this, those examining the localities themselves must be better judges than those looking at hand specimens. It is certain that no specimens have yet been sent, sufficiently pure to be sawn in slices or for grinding in the mills. The specimens last sent are valued at not more than £5 a ton.

Mr. Ruel celebrated for making crucibles (v. Jury Report) considered that the specimens from Travancore were not worth more than 8s. a cwt. for his purpose, though the price is sometimes as high as 14s.

A good practical test, I am told, is that of chewing a small piece, when, if not gritty, it will probably be found to be sufficiently pure for grinding up.

It is possible, however, that the enquiries now being made by chemists may devise methods by which the impure specimens may be made available for purposes not yet generally known. I have been asked by one of our intelligent chemists to ascertain the quantity in which the Travancore Graphite can be obtained, and the cost per ton at which it can be delivered on board ship. It seems desirable therefore to forward a copy of this communication to Travancore as well as to Kumaon.

Memorandum on an unknown Forest Race (of Indian Veddas?) inhabiting the Jungles South of Palmow; and on the deserted city of Dhoolmee in Manbhoom.—By HENRY PIDDINGTON.

About the year 1824 or 25, being then extensively engaged in Coffee-planting, I used to have large gangs of Dhangur and Cole coolies coming direct from their country to work on the plantations. The principal factory where I resided was, so to say, accessible by one road only, being situated in a deep nook formed by an extensive jheel.

Shortly after the arrival of a large gang of Dhangur coolies, I noticed on my rides and walks that great numbers of the village people were constantly coming and going to and from the factory. They used always to come and go freely on their little affairs with the coolies or servants of the establishment, but the concourse now was almost like that to a *hát* or *meldá*. Remarking this, I at length enquired of my principal assistant, a very respectable Portuguese man, what the reason of it was. He told me in reply, that the people were flocking from all quarters to see what they called the "monkey people." Upon enquiring who these people were, he informed me that with the last gang of Dhangurs there had arrived two persons a man and a woman, "who are exactly like great monkeys, Sir, and the natives call them the monkey people (বাদুর লোক). They cannot even talk the Dhangur language properly, Sir, but have a language of their own."

I desired these persons to be sent for, and certainly they in all respects, and especially the man, justified the epithet which the villagers had applied to them. He was short, flat-nosed, had pouch-like wrinkles in semicircles round the corners of the mouth and cheeks, his arms were disproportionately long, and there was a portion of reddish hair to be seen on the rusty black skin. Altogether if crouched in a dark corner, or on a tree, he might well have been mistaken for a large Orang-Utang. The woman was equally ugly: I shall state presently why I did not take down an exact

description of them at the time. I should remark here that I was not like a person newly arrived from England liable to be led away by an imagination excited by the previous account of these people, for I had seen many varieties of the human race from the Bosche-man and Hottentot of the Cape, eastward to the Papua and Harafora, the savage of New Holland and New Zealand, and the Kanakas of the Sandwich Islands, and I had looked at these too not incuriously, but these people were evidently so different from the Dhangurs (and so considered by them too) that it was impossible not to be, as it were, convinced that they were a different race.

Of this the most unquestionable proof was their language. It was only with great difficulty and by the aid of signs that one of the Dhangurs, evidently a very intelligent fellow, could make them understand the questions put to them; the result of which was, that they lived a long way off from the Dhangurs in the jungles and mountains, that there were only a few villages of them, and that in consequence of an accident or a quarrel, the man had killed a man of another village, for which his own people were about to deliver him up; in the fear of which he fled with his wife, and after passing a long time wandering in the jungles they had fallen in with my party of Dhangurs who had given them food and had brought them down in their company. This latter part of their story was corroborated by the Dhangur Sirdar, who said, they were nearly starved when his people met with them. The Dhangur who had acted as interpreter said that some of their words sounded "like his talk," and that they understood a good many words of the Dhangur language. All agreed that they had never seen or heard of this people before.

I thought all this so curious, that I told them immediately that I should send them to Calcutta to a gentleman who wished to learn their language and hear about their country, and that they should have good pay and would get some presents. My intention was to send them to my friend and partner G. J. Gordon, Esq. of Mackintosh and Co. for Dr. Abel's inspection, and that of the Asiatic Society; and I never supposed for an instant that this could possibly alarm them and so did not note any exact description of them. It seems, however, that it did so, and that as I suppose the man thought, perhaps, that I was going to send him to prison

for his homicide, which act by the way he explained very clearly to us by signs as well as words, or that they were frightened in some way by the Dhangurs or villagers ; for the next morning it was found that they had absconded ! and I could never hear of them again to my very great disappointment, for I felt, and still feel certain, that they were of a race utterly different from the Coles and Dhangurs, and probably approaching to the Veddahs of Ceylon.

When we recollect that until the Goomsur Campaign, we knew nothing of the extraordinary people inhabiting those jungles, and that it is only since we have had a station at Darjiling that we know any thing of the Lepchas, and recently again to the eastward of the singular people who live on trees in the Chittagong or Tipperah territories.* When we recollect all this, and that not many years before Lord William Bentinck's government a Civil Servant of high standing, in a public minute, scouted the idea of the existence of Thuggee,† and again in the note from Captain Oakes which I have submitted to the Society‡ when we find that the ruins of the city of Doolmee are within a few miles of the station of Purulia, and yet are only now to say discovered, through a rude legend of a petrified city perseveringly investigated. When we consider all this, then, I hope it will not be thought extravagant to suppose, that we really have a small forest tribe buried somewhere in the vast jungles of the wild country between Palnow, Sumbhulpore and the head waters of the Nerbudda ? and I place my recollection of them now before the Society, in the hope that by giving it publicity, we may direct enquiry to the subject, and perhaps rescue from utter oblivion a remnant of one of the aboriginal races of India who, as to appearance, may well justify the singular myth of Hanuman's aid to Rama in the conquest of Lanka ; which, like all other myths has no doubt a remote foundation in truth, such a one for instance as the tradition that the people who assisted the hero-god in his war, were like

* It was about the date to which I refer above, or later I think, that the Todawurs of the Nilgerries were first discovered.

† I have seen this in one of the early volumes of the Asiatic Annual Register, about 1820, I think, but I cannot refer to it.

‡ Published below : Its publication was deferred in the hope of further particulars from Captain Oakes, after his proposed visit.

monkeys? which would have been perfectly true, if said of the forefathers of this singular race.

Since the foregoing was written (in the month of September last) I have lately obtained, in conversation with my friend, Dr. Falconer, a very remarkable confirmation of the views it sets forth. Dr. Falconer states that when in London he was intimate with Mr. Traill, for many years Commissioner of Kumaon. That gentleman told Dr. Falconer that, hearing from the natives curious accounts of a race of men who, like monkeys, lived in the trees, and who inhabited the depths of the forests of the Teraee, he had after much trouble succeeded in having one man brought to him, whose appearance was also most extraordinary and fully justified the epithet of रन शानूष, which the natives applied to him. Mr. Traill found him also so excessively timid and alarmed, that though he was desirous of keeping him for a short time, in hopes of inducing him and his tribe to enter into some intercourse with the Residency, he would not detain him; and so giving him some presents he sent him away. Nothing was ever heard of him or of any of his tribe afterwards!

We have thus upon three several points of continental India the indubitable fact (for the account of the Tipperah, or Chittagong, tree-inhabiting race is I think official?) that there are wild tribes existing which the native traditional name likens to the Orang Utang, and my own knowledge certainly bears them out, for in the gloom of a forest, the individual I saw might as well pass for an Orang-Utang as a man.* What are these singular people?

The City of Doolmee.

Poorolea Maunbhoom, the 15th August, 1854.

MY DEAR SIR,—With reference to my note of the 21st June last, I have now the pleasure to furnish you with the few particulars

* Since this was written, I find in Vol. II. of the Journal, page 583, in a paper on the Birds of Borabhoom and Dholbhoom by Lieut. Tickell, the following curious passage. After affirming the existence of the Hippopotamus and of an enormous snake, the writer goes on to say "and lastly from a casual glance, I once caught of an animal in the thick and high woods bordering the Gurum *nala* near the valley of the Subunreekha, it would be the corroboration of an anxious surmise were after researches to establish the fact that the *Orang-Utang* is an inhabitant of these forests.

which I have been able to collect relative to the ancient city of Doolmee in the Patkoom Pergunnah of this district.

1. Doolmee (not the Doolmee of Tassin's Map) is situated within a mile of the river Suburnreeka, [near the junction of the Kurkurra with this river] and 24 miles South West of Poorolea, and 5 miles N. W. of Eshaghur.

2. The ruins of a Rajbatee or Palace are to be seen at Doolmee : there are also many remains of temples, and images of gods and goddesses.

3. There is an inscription on a temple which is on the top of a hill (the door of which temple has been blocked up) within half a mile of Doolmee, and a few yards of the river—there is another large river near the temple.

4. There are two large tanks, one is called "*Chhatta*" and the other "*Kájál-gowra*" tanks. Chhatta tank takes its name from a large stone umbrella in the middle of the tank, 6 feet above the water, and is near the Palace. Kájál-gowra is said to have been dug within one night for Bhánoomutty, the wife of Bikramáditya.

5. The site of the Palace extends 4 miles, within which are dispersed many images of gods and goddesses, and images of beasts.

6. The city was built with bricks.

7. Raja Bikramáditya is said to sleep at Doolmee, and to bathe at Kutwa, and to hold kutcherry at Mungulkote, and to take his meal at Juggernaut (Pooree).

8. Tradition runs that a large quantity of wealth is buried within the Palace, and the wells adjoining it, which if dug, protecting serpents destroy the diggers ; and when Rájá Bikramáditya was translated into heaven, the inmates of the Palace were petrified.

This is not the season for visiting the spot ; but in the cold weather I shall make a point of going there, and should I be successful in obtaining any further information about the said Doolmee, I will communicate the same to you with great pleasure.

Your's very truly,

G. OAKES.

Memorandum on the Kunkurs of Burdwan as a flux for smelting the Iron Ores, and on some smeltings of Iron Ores by Mr. TAYLOR, of that district.—By HENRY PIDDINGTON, Curator Museum Economic Geology.

The question of Iron Ores and smeltings is just now engaging much attention, and I have therefore thought it of use to publish my recent, and former, examinations of the Kunkurs of Burdwan, which will be found below, and I have been induced to do so by a desire to make known the following facts.

Mr. C. B. Taylor of Toposi Colliery in Burdwan has just sent us a number of Iron Ores from that district, as reported at the December meeting, and with them a small quantity of the nodular Kunkur of the same localities, and on a visit to the Museum, Mr. Taylor also claimed as his work Nos. 41 to 45 of our series of washings and smeltings of Indian Iron Ores, which are specimens of the raw and roasted Burdwan ore, and of the same when smelted; with two spike nails forged from it. What is essential to our present purpose herein is, that Mr. Taylor had fortunately sent with the specimens, the Kunkur which was used as a flux to the ore in his little experiment, which was performed in a rude native built furnace. This little series was presented by Mr. William Prinsep to the Museum of Economic Geology.

I thought it, then, well worth while to examine these Kunkurs of Mr. Taylor's, for if good nail-iron can be produced with the common Kunkur of Burdwan, the question of flux is set at rest until it is exhausted, and it is said to be found every where and in considerable quantities at the surface. The late Mr. Williams in his report says at once, as indeed any English miner would be ready to do, that the Kunkur is too earthy to serve as a flux, and he proposes to send to Sylhet for Limestone, which thus becomes a formidable item in his estimate of the cost of iron from this locality.

Beginning with the most recent specimen, Mr. Taylor's Kunkur of 1854, there are evidently two kinds of the concretion, and they

differ as much as 6 per cent. in their composition. It is difficult to give them names, but we may call the best kind, which is in globular, bullet-like nodules (called I think *Gooties* both in Behar and Burdwan ?) the globular Kunkur ; and the other which is in somewhat flattened and irregular lumpy concretions the Botryoidal Kunkur.

The following are the analysis of these Kunkurs with reference only to the quantity of carbonate of lime which they contain

			<i>Carbonate Lime in 100 parts.</i>
	<i>Date.</i>		
1854	A.	Globular Kunkur, ..	Mr. Taylor. 62.25.
	B.	Botryoidal, .. ..	.. 56.75.
1849	C.	Globular.. Flux for the Iron Ore of No. 41, to right	50.20.
1826	D.	a Sylhet Limestone,.. Piddington, ..	96.50.
	E.	Kunkur from Burdwan Crystd.	do. 71.00.
	F.	Do. do. do. do.	do. 72.00.
	G.	Do. do. do. do.	do. 71.50.
	H.	Do. do. do. do.	do. 71.25.
	I.	A marly earth.. do. do.	do. 50.00.

Referring to Mr. Taylor on the subject of his specimens, he has obliged me with the following very interesting notes on his iron experiments and the Kunkurs, which at the present moment are valuable, as shewing what has really been done with Burdwan ores, with only rude native apparatus, and by an unprofessional man.

"It is out of my power to say whether the specimen of iron presented to the Asiatic Society by Mr. William Prinsep, and made by me up here was smelted with coke or charcoal. To the best of my recollection I sent several cart loads of the cast iron, made in several experiments, both with charcoal and coke, and which of these he gave to the Society is more than I can tell. I have, however, preserved a memorandum of three experiments made with coke, and three with charcoal, which I enclose. These experiments were principally made with the red ore of Sheargur, but in some of the experiments I either mixed, or tried separately, some of the red gravel magnetic ore, a specimen of which I have already given you, although not from the same locality. The red gravel ore which I

gave you in May last, came from the North of the Adji river. What I tried up here in 1837 or 38 came from the South of the Damoodah. I really forget whether the experiments above referred to, were made in the cold season of 1837 or 38, my memorandum does not state which, it was however either one or the other. Observe in the memorandum, that it took 36 maunds of charcoal, with 20 maunds of ore to make 8 maunds, 20 seers of cast iron, and that it only took 14 maunds of coke to make 9 maunds, 28 seers of iron. This is of great importance, for although charcoal may be had up here, coke would be the most economical fuel to use in smelting. With some of these experiments, I used Kunkur lime and which I recollect greatly assisted in the fusion of the ore, but unfortunately I have not preserved any memorandum of the proportion of Kunkur used, I think the first experiment was made with the red ore of Sheargur, and which is found lying over the clay iron stone, as well as the coal measures. I think you call this ore in something that you have written about the ore of this district in the Journal, "red ochre ore." (Red ochry iron ore of Jameson. Researches, Vol. XVIII. n. p.)

I really cannot give a decided opinion as to the quantity of Kunkur to be found in this part of the world. I have never found any scarcity of it. In some places, the deposit, however, is only superficial, but in some places it is found deep in the ground. I know several deep deposits ; not only in this purgannah, (Sheargur) but in the neighbouring ones also. Whether there is sufficient Kunkur to supply a number of blast furnaces, and for how long a period, cannot be ascertained without a search being made for that purpose alone. But I am of opinion that in the first instance a number of blast furnaces might be easily supplied, a large consumption would however soon make it scarce, but the neighbouring purgannahs might continue to supply it for a long period of time."

Table referred to by Mr. Taylor.

Experiments made in smelting the iron ores of Sheargur, with Charcoal and Coke, in the cold season of 1837 or 38.

Ore.	Charcoal.	Coke.	Iron.	Per Cent.
29 Maunds....	36 Maunds.	.....	8 mds. 20srs.	42 pr. ct.
29 ... ,	32 ... ,	.....	10 " 20 "	36 $\frac{1}{2}$ "
26 ... ,	25 ... ,	.....	8 " 20 "	32 $\frac{2}{3}$ "
19 mds. 20srs.	.....	18 mds. 20srs.	3 " 25 "	18 $\frac{1}{2}$ "
28 maunds. ....	.....	17 " 20 "	7 " 8 "	25 $\frac{1}{2}$ "
27 maunds. ....	.....	14 " 0 "	9 " 23 "	35 $\frac{1}{2}$ "

In some of these experiments, a mixture of red gravel ore, highly obedient to the magnet was used, and likewise Kunkur or Nodular lime-stone, but I have not preserved any memorandum of the proportion of either, or in which experiment they were used.

Notes on Eastern Thibet.—By Dr. A. CAMPBELL, Superintendent of Darjeeling, (with Sketch Map of Route to Lassa).

This opportunity is taken of publishing a sketch map protracted some time ago by Major Crommelin, it will enable the reader to understand readily the position of the principal places mentioned in Dr. Campbell's Notes.—ED.

Having lived many years in the Eastern portion of the Himalaya, viz. in Nepal and Sikkim, and visited the Bootan Dooars or Lowlands annually for eight years, I have had many opportunities of becoming acquainted with the natives of Thibet, who visit these countries and the plains of India to trade, and on religious pilgrimages—I have also travelled over the whole of Sikkim, and penetrated a short way into Thibet in that direction.* It is from these people, and on those excursions that the substance of the following Notes has been collected by a good deal of laborious questioning, and in the course of official business. I am familiar with the writings of Turner, Huc, and others on Thibet, I have not used them, however, to correct these Notes, nor do I wish to substitute my own information for any portion of these published accounts. My only aim is to add a little to the scanty knowledge we now have of Eastern Thibet; and I shall be glad if I have not quite failed in my purpose.

* With Dr. Hooker in 1849.

Thibet is reckoned by Gutzlaff in his 'Life of the Emperor Taou Kwang,' page 227, to comprise an area of 30,200 square miles; and to have a population of about six millions. Thibet, as thus indicated in the enumeration of the dependencies of China, embraces, I believe, Little Thibet or Balti, the capital of which is Iskardo; Western Thibet the principal town in which is Leh, and Thibet Proper or Eastern Thibet, having Lassa as its capital and chief city.

The latest and best account of the Trans-Himalayan regions, is 'Dr. Thomas Thomson's Travels,' published last year in London.

Following Humboldt, Dr. Thomson divides Thibet into two grand divisions; the western one, of which he treats so ably himself, and the eastern one, to which alone my Notes refer. Western Thibet—according to Dr. Thomson “is a highly mountainous country, lying on both sides of the Indus, with its longer axis directed like that river, from south-east to north-west. It is bounded on the North-east by the great chain of mountains, to which Humboldt, following Chinese geographers, has given the name of Kounlun, by which it is separated from the basin of Yarkund. On the south-east, its boundary is formed by the ridge which separates the waters of the Indus from those of the Sanpu.” “To the north-west and south-east,” continues Dr. Thomson, “its boundaries are somewhat arbitrary, unless the political division of the country be had recourse to, which, depending on accidental circumstances, entirely unconnected with physical geography or natural productions, is so liable to change that its adoption would be extremely inconvenient. The best mode of drawing a line of separation between India and Thibet, in those parts where mountain chains are not available for the purpose, appears to consist in regarding the latter to commence only at the point, where the aridity of the climate is too great to support forest trees, or any coniferous tree, except juniper.”

“As limited by these boundaries, Western Thibet includes the whole valley of the Indus, and its tributaries down to about 6,000 feet above the level of the sea, a considerable portion of the upper course of the Sutlej down to between 9,000 and 10,000 feet, and small portions of the upper course of the Chenab, of the Ganges (Jahnavi) and of the Gogra.”

The above is a very elaborate definition of boundaries, founded

mainly, as regards the limits of India and Thibet, on the geographical distribution of plants. By it the Himalaya, so well known to Dr. Thomson, is annihilated as a mountain chain. The Kounlun however, which no body knows anything of, and which may be quite as frequently cut through by meridional rivers as the Himalaya, is admitted to that distinction.

I shall now endeavour to describe the second grand division or "Eastern Thibet." It is by all accounts an exceedingly mountainous country, i. e. it contains immense masses and ranges of the most rugged mountains in the world interspersed with extensive plateaus and deep level-bottomed valleys along the streams and rivers.

The Thibetans I have met with, do not recognize a continuous chain of mountains running parallel to the Himalaya; nor are they acquainted with "Kounlun" as the name of any mountain range. They are familiar with the Himalaya on one hand and call it "Kangri" which simply means *Snowy region*, and they know that the country of the Mongols, or Mongolia lies parallel to it on the other hand. The third great distinguishing feature in the physical geography of Eastern Thibet is the Yaroo river or Sanpoo of our maps. Thus characterised, I shall say that in popular estimation—which is not founded on the physical features of the country, on its natural productions, or on political divisions of territory, separately or jointly—Eastern Thibet is bounded on the north-west by the Kangtisee range of mountains,* and a greatly elevated tract of country extending from the base of this range; on the north by Mongolia; on the east by the Sifan and Sechuen provinces of China, and on the south by the Himalaya, from the point at which it is pierced by the Burampootur on the east, to the meridian of the Mansarowur and Rawan Rud Lakes on the west. The general direction of the Kangtisee range is north and south, and it is said to connect the Himalaya and Mongolia, as by a cross-bar. It runs to the east of the Mansarowur and Rawan Rud Lakes, its highest point is said to exceed in elevation any portion of the Himalaya, and four large rivers have their sources in different parts of the range, viz. the Singh Khawab or Indus, the Langchoo Khawab which

* The highest portion of the "Kangtisee" range is I believe the "Kylas" of Strachey.

runs through Ladak, the Marchae Khawab which is known as the Gogra, and the Tamchoo Khawab or Yaroo, the great river of Eastern Thibet.

Government of Thibet.

In the city of Lassa,* and over the whole of Thibet "Geawa Remboochi" or the "Grand Lama" is nominally the Supreme authority, in temporal and spiritual affairs. His residence is in Patala Goompa which is on the north side of Lassa.

There are two Resident Envoys from China called "Ampas" stationed at Lassa; subordinate to them are two great officers—Chinese—designated Daloo-he: their rank and occupation are those of general officers. Next to these are two Phopuns who act as Paymasters of the Troops, and perform the duties of our Adjutant and Quarter Master Generals. They are also Chinese. One of the Daloo-hes, and one of the Phopuns are generally stationed at Digarchi. These officers constitute the general staff of the army in Thibet. Next in rank are three Chong-hars. They are Chinese, and Military Commanders; one is generally stationed at Digarchi and another at Tingri near the Nepal Frontier of Thibet. Below these are three Tingpuns, non-commissioned officers—also Chinese. There are no other Chinese military officers in Thibet. The usual number of Chinese Troops, all Mantchoo Tartars, in Thibet does not exceed 4,000 men. Stationed at Lassa 2,000, Digarchi 1,000, Giangtchi 500, Tingri 500.

The above shews that the Chinese functionaries in Thibet are Political and Military officers only.

All the Civil appointments are held by Thibetans. The local temporal Government of Thibet is composed as follows. It is headed by the Grand Lama entirely guided in all Political and Military affairs and mainly so in Civil affairs by the Chinese Ampas and the Emperor of China.

* M. Huc says, that "Lassa" in the Thibetan language means, "Land of Spirits." The Mongolians on the same authority call this city "Monche-dhot," i. e. Eternal Sanctuary. My friend Cheboo Lama gives the following interpretation, "L'ha" means God, "Sa" abode or resting-place. Hence it is the city of God, or the Eternal city.

The first officer is the Chemeling, the second Kandooling, the third Tengeling; they are all Thibetans and the Chief Lamas—Awataris—of Goompas* bearing those names. From these three Lama Counsellors, the emperor of China nominates the Noume-hen,† “Nome Khan” of M. Huc, who may be called President of the Council, or Prime minister. He is Regent when the Grand Lama is a minor, and at all other times is the alter et idem of his holiness. The Noume-hen is always one of the three Great Lamas above named. At his death, or removal from office, he is succeeded in the Noume-hen’s office by one of the two remaining counsellors, always however under orders of the emperor. His successor as head of his Goompa must, as in the case of a “Grand Lama” be an awatar, i. e. he must re-appear in the flesh as a child, and be raised to that position.

Of equal rank with the Noume-hen, but having no temporal authority, is the Genden Tepa Lama, he is next to the Grand Lama himself the highest clerical authority. He is finally appointed by the emperor, being in the first instance chosen on account of his superior attainments and sanctity by the local authorities. He is chief of the great monastery of Genden. The persons privileged to take a part in the selection and recommendation of the Genden Tepa, for his holy office are the Noume-hen, the two Ampas and the four Shapees. They propose him for election to the Grand Lama, after his approval, the Ampas procure his appointment from the

* Principal Goompas at Lassa and its vicinity.

Genden Goompa,	3,500	Lamas resident and itinerary.
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Leea,	5,500	,
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Depoong,	7,500	,
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Gentoo,	500	,
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Grume,	500	,
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Chenamge,.....	1,000	,
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Chalang,.....		
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Chemchung,	200	,
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Kandooling,	200	,
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Tengelling,	200	,
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Chechooling,	300	,
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Moujida Taching,	1,000	,
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† Gealchup Noume-hen is the proper title which being translated is “the image of Grawa” or the Grand Lama.

emperor. The Genden Tepa, is chief Lama of a Goompa, but not an awatari Lama.

Next in rank and power to the Noume-hen are the four Shapees. They are not Lamas, always Thibetans, and the principal executive officers of the Government in the Financial, Revenue and Judicial Departments. These departments are not separated and under distinct officers. The Shapees are the highest Judicial officers in the Civil and Criminal Courts. Next to the Genden Tepa is the "Lama Yeungjing" the private guru, or high priest of the "Grand Lama." He is also appointed by orders of the emperor, and is sometimes an awatari Lama, but not always. His office is to teach and train the Grand Lama in childhood and youth, and lead him, if he can, afterwards. This is indeed an important personage in the Bhuddhist world, being no less than the keeper of the Grand Lama's conscience. The nomination to this post being in the hands of the emperor, furnishes an interesting clue to the extent of the imperial power over the church of Thibet.

The Che kap kempu Lama is a churchman of great influence in the Government. He appears to represent the Grand Lama in the council of state and in the deliberations of the Shapees. He may be called Secretary or Minister for the church, and the Shapees may, correctly enough, be called the Financial, Judicial, Revenue and Home secretaries or ministers.

The Treasury is managed by two officers named Jhassas; both are Lamas, and act conjointly, although one of them is Treasurer on behalf of the "Grand Lama," and the other on behalf of the Noume-hen or temporal estate. They are assisted by two Sub-Treasurers styled Shangjotes. Four officers designated Da-puns are the commanders of the Thibetan Troops, and act as Civil and Political Commissioners on occasions of Frontier or other disturbances, they are Thibetans, and not Lamas. The ordinary course of official promotion is from a Da-pun to a Shapee; of equal rank, to the Da-puns is the Che-pun who is however a Civil officer and acts in all Departments as Deputy to the Shapee.* This officer is often employed as Commissioner on Deputations in Civil affairs either Judicial or Fiscal,

* Shete Shapee is the energetic Commander-in-Chief of the Thibetan army now opposed to the Nipalese under Jung Bahadoor.

and all the cases sent up by the Police for trial before the Shapees are forwarded through this officer. All appointments to the offices above noted, require the confirmation of the emperor.

1. *Tinkpun*—Superintendent of Police and Jails.
2. *Sherpankpa*—Assessors to the Superintendent and to act as checks on his proceedings.
3. *Boopun*—Military officers subordinate to the Da-puns but also employed in Civil affairs when required.
4. *Jongpuns*—Collectors of Revenue and Magistrates in the interior. They hold office generally for three years only. They are all laymen, one of these officers who is employed in the district of Gar known to us as Gartope, is named the Garpun. He has charge of the salt and gold-diggings in that direction both of which are valuable. In the Kampa country to the East of Lassa, these officers are styled Markam teje.
5. *Giapuns*—Subordinate Military officers, Non-commissioned.
6. *Dingpuns*—Ditto, ditto.
7. *Choopun*—Ditto ditto. Privates are called Ma Mi, which means "fighting men."

The patronage of these 7 classes of officers nominally lies with the Gealchup Noume-hen, but the Chinese Ampas have a veto if they desire to exercise it, and the working of the system is to procure the approval of these high officers to the appointments before they are made.

One of the Ampas annually visits the Nepal and Ladakh frontiers.* The Noume-hen and the four Shapees have the entire control of the land assessment, commerce, customs and other sources of revenue, and, I believe, that no account of the revenues, or the disbursements of Thibet are required by the Emperor. The Chinese Troops and

* In 1846, Keshen was the only Ampa or representative of the Emperor in Thibet but he was one of the eight Tongtongs of the Empire and specially deputed to arrange Thibet affairs at that time and the usual system of two Ampas was then suspended. The following anecdote of Keshen is very characteristic of the self-deceiving system of the Emperor's Government. When Keshen was ordered to be executed for having sold the interests of his country to the English during the War, his life was spared at the entreaty of "Sac Lama" the friend of the Emperor "Taekwong" and sentence of banishment in chains was substituted. Subsequently

all the Chinese officers in Thibet are paid by China and in money; the Thibetan Troops by assignments of the Government share of the land tax. There is no money Revenue sent to Pekin, an annual Embassy with presents only in cloths, images, books, incense, &c.

There is a fund in Patala Goompa to which 100,000 rupees is added annually. Never opened except in time of great war expenses, it was opened to repel Zorawur Singh the Sikh General, who invaded Thibet from Cashmere in 1842. The Ampas pay is 140 Rs. per day, and he gets large presents while travelling in Thibet.

A Shapee's pay is 140 Rs. per mensem from China, and he has lands and other emoluments from the Grand Lama.

Army.

They have no Artillery in Thibet; the Cavalry so called is mounted on ponies; the principal troops are Infantry and great pains are taken to make them good marksmen. Prizes and promotions are the invariable rewards of good marksmen. The Chinese or Tartar troops are kept quite distinct from the Thibetan ones, which are only a Militia called out when required, and not regularly paid. The Imperial Troops quartered in Thibet do not exceed 4,000 men, and the Thibetan force is not so strong. There are 2,000 Imperials at Lassa, 1,000 at Digarchi, 500 at Giangtchi, and detachments at Phari, and Tingri. The last named post, is on the high road from Cathmandu to Lassa, and is situated on a Plateau called the "Tingri Maydan" by the Nepalese. The Imperial troops are armed with long matchlocks, to which a rest is attached. The Thibetans have very few firearms, being provided with bows and arrows, and short swords. The powder is of a very inferior description, and it does not appear that the troops are ever practised in military manœuvres.

at the urgency of the same Lama, Keshen was appointed viceroy to Thibet. Affairs at Lassa, and throughout Thibet were in great confusion at the time; three Grand Lamas had died by poison in a few years and the Noume-hen was suspected of the crime. Keshen had the opportunity given him of redeeming his fame, and he did so by re-establishing order in the country, and convicting the Noume-hen. It is a curious fact, however, that he proceeded from his banishment in Manchouria to his Government at Lassa *in chains*, that is to say, he wore a gold chain, the badge of punishment round his neck, concealed by his garments, nor was it removed, and his forgiveness complete until after he quitted Lassa as Governor of Sechmen.

Personal Habits, Customs and Ceremonies of Thibetans.

The Thibetans of the higher class wear Chinese satins in the warmer seasons, and the same lined with fur in the cold; all others, male and female, wear woollens in the warm, furs and sheep skins in the cold weather, and never go about without boots. The men do not go about armed. The common people never wash during the cold season; very sparingly at other times. The reason given for this being that the skin of the face cracks and ulcerates from the cold, if water is applied to it. The people of towns, who do not go much outside the house, wash occasionally, but the universal prejudice is strong against ablutions of the person, and it is equally extended to their clothing which is worn in a filthy and greasy state.

Soap is high priced and little used in Thibet; it is not manufactured there. The supply is from India, through the Cashmere traders via Ladakh, and from Nepal. A small quantity also goes from Bengal through Bootan and Sikim. There is a grass in the country or a plant like grass, the root of which pounded with water, makes a lather and is used for washing clothes.

Travelling in the winter and indeed generally is performed on yaks. The women ride astride on them like the men, and they are so masculine and dressed so much alike that it is difficult to distinguish between them.

A Thibetan village or town is never surrounded with filth, as in India. To every house there is a privy, and the contents are carefully preserved for manure. In some situations, where the soil is suitable, saltpetre is made from the earth about the privies, but the regular supply of this article, which is used for making gunpowder only, goes from India.* In towns the contents of the privies are sold annually, and those of people of wealth sell highest.

It is well known that the dead are not burned or buried in Thibet, but exposed on high places to be devoured by vultures. For this business there is a class of men who make it their sole vocation. They

* At the time of the Sikh General, Zorawur Singh's disastrous incursion from Ladakh into Thibet as far as Gartope, 1842, there was a good deal of saltpetre taken into Thibet through Sikim, also sulphur and lead bullets.

are called "Raga Tongden;" they are a low race held in dislike and shunned, but they are generally rich. They go about to the living, begging and extorting money. When refused or ill-treated, they retaliate with abuse which is often successful. "Very good," say they, "you won't give us alms now, you will come into our hands some day, and we will put a rope round your neck, drag your body through the streets, and throw it to the dogs," and the latter part is the frequent fate of the poor man's body, as these men keep numerous dogs to devour the bodies.

The bodies of the wealthy are carefully disposed of; they are carried in a litter to the top of a hill, set apart for the purpose, the flesh cut in pieces, the skull and bones pounded in a mortar, and when all is ready a smoke is raised to attract the vultures, who collect in thousands to eat it up.

The Chinese have spacious burial grounds at Lassa, and Digarchi, and there, as in their own country and wherever they reside, they are well cared for and ornamented. The Lassa one is said to contain 100,000 tombs. In the time of Wangh, a celebrated Raja of Lassa, there was an insurrection against the Chinese which ended for the time in the annihilation of the whole army, and the massacre, by the Thibetans, of the whole Chinese population. The funerals of the Chinese at that time were estimated at 4,000. This massacre was punished by the Emperor with signal vengeance, and since that time the Chinese supremacy has been finally established all over Thibet. There was a petty insurrection in 1843, in which many Chinese were killed.

Religious Festivals.

There are twelve great annual Festivals, viz. Bumteung, Kansupecha, Chúchupecha, Gesúpecha, Nesúpecha, Gosúngpecha, Gyajeepecha, Lallípecha, Chindúpecha, Dúdúpecha, Kagyurpecha, Lukphopecha. Pecha is equivalent to Pujá.

On the anniversary of the death of a Chief Lama of a Goompa, there is a great festival and illumination. At Tashi Lumbu, three such are held annually.

The "Lassa Morun" festival of M. Huc is properly called the "Lha-sa Meuhlum." It is the anniversary of the first proclamation the Religion of Boodha by Sakya, at Lassa.

Seasons.

The year is divided into four Seasons. First Chid, or early Spring, February, March and April. Second Teuh, or Spring proper, May, June and July. Third Yirrh, or Rains, August, September and October. Fourth Gunh, or Winter, November, December and January. Some showers and southerly winds occur in Chid. In Teuh, it is temperate and dry, but showers, thunder and lightning* occasionally prevail. In Yirrh, there is constant but not heavy rain and hail in September and October. Frost begins early in November and increases all through the winter. Heavy falls of snow are rare except on the mountains.

Soils.

Only three kinds of soil are recognized; a blackish one, a reddish one which is described as rather clayey, and a greyish coloured one, which is also clayey and contains a good deal of sand. The last is found along the beds of streams and yields good crops. The reddish soil is also fertile; it frequently contains gravel and stones; it is the prevailing soil in the tract called Dingcham, which extends along the northern face of the great Himalayan chain from Tawang to Keroong, but this region is quite barren. Mean elevation 16,000 feet at least. The blackish soil most abounds in the districts or provinces of U and Chang; it is the most fertile of all, but also contains stones and gravel.

The fertility of the culturable soil is highly spoken of, and 40 to 50 fold in wheat is considered the average. Crops are generally very certain, and blights or other accidents rare. Early frost sometimes overtakes the harvest and spoils the grain, when the grass is at the same time burnt up, and this causes scarcity and famine. It is then the granaries are opened, and the corn-merchants make their fortunes. There is no interference with the price of grain. It is always dear compared with India, but varies considerably; and the principal cause of scarcity appears to be the early setting in of

* In 1845, a great earthquake was experienced in the Province of Kham north-east of Lassa. It was most severe in the district of the Dirgi Raja. About 3,000 men were killed, and a Goomba destroyed by the opening of the earth.

About 20 years ago, the district of Kompo in the Province of Kham was visited by a severe shock; one village was destroyed by the opening of the ground.

frost. This is said to be induced by continued clear nights which are greatly dreaded in harvest time.

Agriculture.

Wheat, barley and other crops sowed in April and May are reaped in September and October; all are irrigated. The peach ripens at Lassa in October and November. It is sun-dried and preserved. No grapes are grown at Lassa. The whole supply of raisins is received from Ladakh. The plough is used in all old cultivations: yaks, bullocks and ponies occasionally are trained to it. The plough is the same as the Indian one, made entirely of wood, except the stock which is pointed with iron. Timber for ploughs is imported from Sikim and Nepal. Rhododendron Hodgsoni, and birchwood make the best ploughs. Cultivation in fresh lands is done with the hoe. The Thibetans do not use a harrow, the grain being covered in with hand.

Barley in Thibet takes the place of potatoes in Ireland; four-fifths of the population live on it.

Neither wheat, barley nor peas will come to maturity as a paying crop in any part of Thibet without irrigation, and the water flooding of the fields, by which they derive a fertilizing effect from the frost, is equally necessary to prepare the soil for these crops. Wheat requires three or four irrigations or waterings from the time the seed is sown till the ear bursts, after which it will ripen without further watering. The flooding of the lands in winter, and watering of the crops in summer are principally effected from drains or canals cut from the rivers: very little watering is performed from wells. The whole of the arable lands along the Painom river and the most of it on the Yaroo Sanpoo are terraced and have maintaining walls of stone raised a little above the surface of the fields. Great pains are taken for the equable distribution of the water by running it off from terrace to terrace, and it is applied from leather bags when it cannot be brought to run on particular spots. Watering freely is indispensable to all crops in Thibet. The atmosphere is so dry and the soil so destitute of moisture, that without it the sun burns up the crop before it comes to ear. In a land of so little rain and with an atmosphere so dry and sun so scorching as to render irrigation and free watering indispensable, the questions which naturally arise are, What extent of area can be watered from the rivers by canals and

drains? and Is there more arable land in Thibet, than admits of being irrigated from the rivers?

To answer the first question, it would be best to refer to the statistics of the Nile irrigation, in illustration of the extent to which land on either side of a river may be irrigated by artificial means, not by the overflowing of its banks which is not usual by the Yaroo of Thibet, and is therefore not be taken into the comparison. I have not the means of making this comparison. But to reply to the second question I have taken much pains to collect facts, the most prominent of which are as follow:—

1st. The culturable land on either bank of the Painom river, from its source to Digarchi, has not a maximum breadth anywhere of more than four miles, i. e. eight miles in all for the extreme breadth. In many places however, the river is closely confined by mountains.

2nd. From Digarchi to Giangtchi on the Yaroo one day's sail, the culturable land on either side the Yaroo varies from two to four miles.

3rd. From Giangtchi till the Yaroo escapes from the Kambola range, its course is exceedingly tortuous, generally through great mountains, and it has but a very narrow bed of culturable land in a few places. It is closely pressed in by great mountain ranges in the Kambola district, and elsewhere in this portion.

4th. I allow the utmost extent of culturable land ever given to me by an informant for the Yaroo valley from the point at which it leaves the Kambola range entirely to the junction of the Kechoo or Lassa river; and that is a total breadth both banks included varying from 20 to 40 miles. There is more flat land on the South than on North bank of the Yaroo.

5th. The Kechoo River is closely hemmed in by mountains on the Eastern bank; on the Western bank it has a belt of about 4 miles of culturable land only.

These particulars will afford some assistance for reckoning the culturable area of the finest part of Eastern Thibet, and will shew it to be very small indeed, compared with the total area of this rugged country, and it is universally asserted that the land is everywhere dependent on river irrigation for its fertility. On this subject M. Hue says "Poulon, fine purple cloth, scented sticks and wooden

bowls are the only good manufactures, neither is their agricultural produce remarkable. Thibet, being almost all covered with mountains and intersected by impetuous torrents, furnishes its inhabitants with but little soil suited for cultivation, the valleys alone can be sowed with any prospect of reaping a harvest." When the Yaroo does overflow its banks, the sediment it leaves, is fertilizing. The Yaroo soil deposit is generally light and sandy.

Three feet of digging brings you to the water at Digarchi which stands in the flat and low Delta of the Painom and Yaroo rivers. 20 feet is required at Kambajong.*

Many Thibetans believe that the Painom rises in Sikim, but its sources are no doubt, as given by Turner, in the vicinity of the Ramchoo Lakes, north of Phari. A horse Dak is four days from Digarchi to Lassa, a boat by the Yaroo takes 12 days to the disembarking place, nearest to Lassa. It is 12 days' journey to the Salt Lakes from Digarchi, due north.

Crops, Rotation of, &c.

The number of crops is very limited; wheat, barley, buckwheat, peas, turnips and a little mustard, comprise the whole. There is no regular rotation observed. As in India with all crops, so it is in Thibet. Wheat is grown for generations in the same ground varied, in some places, by barley or buckwheat; about three times as much barley being grown as wheat. All the suttoo eaten with tea is roasted barley, and this may be considered as the staple article of food for all travellers. See M. Huc *passim*.

At Digarchi, Giangtchi, and generally in the Province of Chang or Tsang, grain is more plentiful than in the neighbouring province of U; in the former 10 to 15 seers, (20 to 30 lbs.) of wheaten flour per Company's Rupee is reckoned cheap, and in the latter about half the quantity is so.

The dung of animals is so much in request for fuel, that scarcely any is used for manure, nor is there any spare fodder or other vegetable matter available for composts. Human ordure and ashes are therefore the principal manures in use; both are carefully preserved, and very valuable. In the towns the contents of public privies are a source of revenue to the Government, and lodging-houses have

* Kambajong a Police Station in Dingcham. See Hooker's Himalayan Journals and Map.

privies attached to them which are most jealously watched. The contents of these places are removed by a class of people who principally live by the occupation, and are the filthiest of all the population, which is everywhere and in every grade, very dirty. They work with their hands at their vile occupation and in the middle of it unwashed may be seen drinking hot tea, and eating raw and sun-dried flesh close to the piles of ordure. Ashes are mixed with the ordure, and this is reckoned the best of all manures. Liquid manure, (ordure with water,) is also in use, but sparingly. This mode of using manure is probably taken from the Chinese.

Scarcely any weeding is required, as the crops grow nearly free of all weeds. When necessary, it is done with the hand, the weeds being carefully preserved for the cattle.

The Thibetans reap with an untoothed sickle, the crops being all cut close to the ground to save the fodder. Wheat is tied up in small sheaves and stocked on the ground, or in yards near the houses. The corn is beaten out by the flail as in Europe, the women taking a part in the threshing with the men. This is done with great care, so that not a grain is lost. There is also a kind of hackle used for beating out the corn. A beam 8 or 10 feet long toothed with iron spikes, through which the sheaves are drawn. The winnowing is performed in the open air.

The grain is ground into meal by watermills. In some villages, mills are built by subscription, and the parties use them in turn. There are public mills also. The millers in these take one part in 20 as payment. There is a great press at the mills for two months after the harvest, when they are going day and night, as frost sets in in November so hard that they cannot be used again till the spring. There are no windmills in Thibet I believe, although in no country in the world, I believe, is there a more steady wind in the cold season, than here.

Wages of Labour.

A Chinese soldier is very highly paid in Thibet, i. e. he gets as much as 12 to 16 Company's Rupees per mensem. The Thibetan soldier has no regular money pay. He is allowed the Government share of revenue on a portion of land, his own farm or another, and this does not exceed 40 or 50 Company's Rupees per annum.

Masons, carpenters and other artificers can earn from 8 as. to 1 Rupee a day in the towns ; common labourers three and two annas. Gold and silversmiths are highly paid, 8 as. in the rupee for fine work is the usual rate.

Breads, &c.

The bread is all unleavened, and cooked on heated stones or grid-irons. The poorer people make their bread with coarse wheaten flour and water, the better classes with fine flour and butter. The latter description I have eaten ; it is a sort of heavy biscuit, made in a long twisted loaf-like shape. The sweet and pure farinaceous taste of the fine flour of Thibet equals the best Cape or American flour. Rice is only eaten in Thibet by the Chinese, and the richer Bhotias. The whole supply is received from Bootan and Sikim. The Thibetans do not cook and eat it plain as the Indians and Chinese do, but make it up into large balls with butter and sugar using it as a pudding and sweetmeat. The staple food of the country is "Champa," called Suttoo in India ; it is finely ground flour of toasted barley. It is universally eaten and without additional cooking, and is excellently suited to the people of a country which is so ill-supplied with fuel. Mixed up with hot tea and formed into solid balls, it is called "Paak." Prepared with lukewarm water, it is called Seu. Travellers often carry the "Paak" ready made in skins, and eat it as they go along, but if it is possible to get fuel, they prefer making a jorum of tea, and having the paak warm and fresh. The Thibetans are great eaters when they are in plenty. Tea is drunk at all houses, and at every meal, and is regularly used four times a day, i. e. in the morning early, about 8 A. M., at noon, and in the evening. For breakfast which is always eaten at daylight and before washing of hands, face or mouth, the favourite dish is Tookpa, a sort of broth, made with mutton or yak's flesh, Champa, dry curds, butter, salt and turnips. This is eaten without bread, and followed by a cup of scalding tea. They never drink tea when it is the least cold, and if a foreigner allows his cup to cool and then drinks it, he is considered a very careless fellow. An attendant is always on the watch when tea is being served, and as you proceed, he replenishes your cup with a ladle or from the hot teapot until you cry "Hold, enough," or

empty out your cup, and put it in the breast of your cloak, the usual receptacle of many necessaries to a Bhotia. The snuff bottle, thick woollen nose cloth, tea cup, bits of dried flesh, &c. are all huddled here, without remorse, and it is a most filthy receptacle.

Salts, Minerals, Metals, &c.

1st. *Peu*, a carbonate of soda, is found all over Dingcham and Thibet, south of the Yaroo ; it appears as a whitish powder on the surface of the soil, never in masses under ground. It is not used to make soap or otherwise in the arts, a small quantity is always put into the water with tea ; it is considered to improve the flavour, and it gives a high brown colour to the decoction. It is generally used in medicine.

2nd. *Chulla*, Borax. I cannot learn that borax is produced in any part of Thibet south of the Yaroo river. The general direction of the Yaroo is easterly. It is largely imported into Digarchi, whence it is distributed to other parts of Thibet and to India via Nipal, Sikim and Bootan, whence it finds its way to Calcutta and Europe.

3rd. *Sicha*, Saltpetre, is produced generally in Thibet and manufactured at the large sheepfolds where composts of sheep's dung and earth are formed to produce it.

4th. *Moghee*, Sulphur, is not found in Thibet. India exports this article for consumption at Lassa where gunpowder of good quality is made. The charcoal of the poplar—(changma,) and of the willow—(langma,) are considered the best for gunpowder, and this is fortunate, as these two trees alone attain to any magnitude near Lassa.

5th. *Lencha*, common Salt. Three sorts are known in commerce.

1. *Sercha*—White and best.
2. *Cháma*—Reddish and good.
3. *Pencha*—Yellowish and bad, contains soda or magnesia and earthy matter.

All the salt consumed in eastern Thibet is the produce of lakes or mines situated to the north of the Yaroo river, or comes from "Lache," a district lying between Digarchi and Ladak, which is traversed by the Yaroo. The best information procurable is to the

effect that all the salt of Thibet is the produce of lakes; still there are people who assert that it is also dug out of the ground. Possibly this is confined to the vicinity of the lakes or to their dried margins. All travellers in Thibet are agreed that the salt-producing districts are the most rugged and inaccessible that can be imagined. It is quite true that men and sheep only can reach the salt deposits. It is also true that the elevation of the deposits prevents their being worked, except for the warmer half of the year, April to November. Thousands of sheep are employed in carrying the salt from the deposits to places accessible to yaks. These latter animals carry it all over Thibet in loads up to 160 lbs. Sheep in open places will carry 20 to 24 lbs.: in the vicinity of the deposits the ruggedness is so great that 8 to 10 lbs. is as much as can be safely put upon them.

Snow falls annually after November in the salt-producing tracts and covers the ground for two months or more. The elevation of these places cannot, I believe, be under 22,000 feet.

At Digarchi, 1st quality, 2 Rs. per maund, or 20 lbs. for 1 shilling.

At Giangtchi, 20 per cent. dearer. At Lassa, 5 Rs. per maund, or 8 lbs. for 1 shilling.

These prices indicate the relative distances of the places named from the salt districts. There are no available means of ascertaining the actual distances. Digarchi, the nearest mart may be twenty days' journey on horseback from the nearest salt lakes. See annexed Route No. 1, of 55 marches for loaded men. (p. 334.)

It is believed that salt is now in course of being deposited in a lake at Tinke in Dingcham—near one of the sources of the Arun river, but it is not worked, and great pains are taken to conceal the fact, as there is a prophecy that whenever salt shall be found in the lakes of Dingcham, the glories of Thibet shall be on the wane; which means that a rush shall be made from all sides for the salt which will render the exclusion of strangers ineffectual. Salt is given to sheep and cattle in Thibet, but not to horses.

6th. *Doh so*, which in the Thibetan language means "Stone charcoal." Coal is no where found in Thibet. It is known in that country as a produce of China which is seen at Siling, and other marts on the Thibetan confines of China.

7th. *Ser*, Gold; is found in the sands of a feeder of the Yaroo which joins it on the Northern bank. The name of this river is not known to me, but it flows from a country called "Shapduk" and falls into the Yaroo to the west of Digarchi. The greater part of the gold of Thibet is the produce of mines or diggings. See Route No. 2, from Digarchi annexed. (p. 334.) The Yaroo itself does not yield any gold-washings. There are no mines of iron, silver, copper, quicksilver or lead in Thibet. All these metals, and their oxides are imported from China.

8th. The yellow Arsenic of commerce is found at Teloongchurfoo, near the borders of China to the North and West of Lassa; it is called Pabea.

9th. *Peu-she*, Amber. The Thibetans always wear large opaque amber-like beads in their necklaces; but the substance is not a produce of their own country, nor is it amber; it is, I believe, expissated turpentine—gundaferoza, mixed with some hardening material. Friction makes it smell of turpentine. It is brought from Siling and other marts of China.

10th. Turquoise, *Gya yen*, or China stone.

Pe yeu, Thibetan stone.

Te yeu, Cashmere stone.

This beautiful stone is greatly prized in Thibet, and every one wears it, real or imitation, in rings, necklaces, earings and amulet cases. The best are very rare, and although found in Thibet, I believe, no one can give an intelligible account of the localities. I do not believe that the turquoise is a natural product of Thibet, and the following story corroborates the opinion.

"A great merchant of Thibet named Chongpo who traded, ages ago, with India, and once crossed the seas beyond India, brought the finest real turquoise to his native country. From that time the stone has been known there, and like coined money, it continues to circulate in the country as a medium of exchange." The imitations brought from China are made of common earthen-coloured or other compositions. They are easily detected. Those imported via Cashmere are real stones but not valuable. The only test of a real stone is to make a fowl swallow it; if real it will pass through unchanged.

Route to the Salt Mines in Thibet.

Digarchi to Punchooling 3 marches. Direction at Digarchi N. W. across the Yaroo.

Amringjong, 4 marches. Direction, N. W.

To Nakchang, 8 ditto, N. W.

Sang-zang Lhoda, 6 ditto, N. W.

Sakojong, 7 ditto, N. W.

To-then, 8 ditto, N. W.

Bomet, 3 ditto, N.

Lon-kurqun, 10 ditto, N.

Tarokchan, 2 ditto, N.

Borgpagege, 3 ditto, N.

To Salt mines, 1 ditto, N.

Being 55 marches for loaded men, each 10 miles, say.

Route to the Gold diggings.

The same from Digarchi as to the Salt mines as far as Sang-zang Lhoda, thence to Kasha 10 marches, N. by W.

To Komunk 5 ditto, N.

Two more marches to Gold diggings, N.

These marches are somewhat longer than the former ones, and may be each 12 to 15 miles.

Animals.

The Goa—An antelope.

Gnow—The ovis ammon.

Rigong—Hare.

Kiang—Wild ass.

Lawa—Musk deer.

Shao—A large deer, Cervus affinis vel. Wallichii.

Cheu or *Chiru*—Antelope Hodgsoni.

Dong—The wild yak of Thibet. The fiercest of all known ruminants. It will rarely allow a man to escape alive if it can come up with him. It is generally hunted on horseback, the great aim being to detach one from the herd. It affects open grassy places and goes in large herds. The following is the plan adopted by hunters on foot for killing the “Dong.”

Its favourite pasturages are ascertained, and in the midst of these the hunters throw up circular enclosures of stone a few yards apart,

the hunter taking up a position in one of them. When a "Dong" is within shot, the hunter having fired at him, instantly quits his enclosure for another; for as soon as the animal hears the shot whether he is hit or not, he, guided by the smoke of the discharge, rushes furiously on the enclosure, and commences knocking it to pieces. When the hunter gets another shot at him he retires again from his shelter to a fresh enclosure, and so on, till he has killed his beast. The ordinary size of the "Dong" is four times that of the domestic yak, it is black all over, having occasionally a white streak in the forehead. The horns of a full grown Bull are said to be three feet long, and the circumference must be immense. The common mode of describing it is to throw out the elbow, bring the fingers to the ribs and point to the circle thus formed as the size of the base. It is used by the grandees of Thibet at marriages and other feasts, when it is filled with strong drink, and handed round to the company. Nothing more commendatory of the host's joviality can be said, than that "he regaled his guest out of the Dong's horn."

The horns so used are finely polished, and mounted with silver, or gold, and precious stones. If I ever succeed in getting one, I shall certainly present it for a "snuff mull" to the Highland Society, as the days of drinking in horns are over with us now.

It is common in Thibetan goompas—(Lamaserais,) to see a stuffed "Dong" standing in front of the image of Mahá Káli at whose shrine the animal is thus figuratively sacrificed; axes and other instruments of sacrifice are ranged around the image. Strange that Buddhists should preserve *this* feature of Hinduism in their places of worship, not more so however than, as Huc describes that a Lama should nearly go into fits on seeing a louse from his tunic impaled for the microscope, while the whole of his countrymen and co-religionists are among the greatest slaughterers and consumers of butcher's meat in the world.

Pegoo—the yak.

Cow—small, like the cow of Bengal. Hair long.

Sauh—cross between cow and yak.

Sauh Yak—produce of cow by yak bull.

Ba Sauh—produce of female yak by bull. These are great milkers, better than yak or cow; tail half-cow, half-yak. Females give

young with bulls or yaks, best produce with yaks. Elevation of shoulder less than in the yak. Hair long but less so than the yaks.

Look—sheep, four principal varieties; 1st, Chang Look, or Northern sheep, very large with fine wool. Flocks of 400 to 1000 tended by one man ;—2nd, Sok Look, rare, but greatly prized ; it is a doomba or heavy-tailed sheep, comes from the province of Sok situated to the east of Lassa ; wool not very fine ;—3rd, Lho Look, a very small sheep indeed, generally white, sometimes black, is bred principally about Lassa ; wool very fine and like the shawl wool ;—4th, Changumpo Look ; abundant about Geroo and in Dingcham, generally very large. I never saw finer sheep in my life than all these were ; white wool very fine and soft. The flesh of all the Thibet sheep is fine-grained and good.

Peu Ra—Thibet goat, small, hairy, of all colours. Has an under coat of fine wool, similar to the shawl wool, but there is no shawl wool trade from Eastern Thibet to India at present. Flesh pretty good.

Phák—pig, two varieties. The Lho Phák or southern pig which is most abundant to the south of Lassa, and is described as similar to the Indian village pig, and the small China pig now abundant in Lassa and other towns: no wild hogs anywhere in Thibet. The Chinese butchers in Lassa blow their pork and take in the country folks greatly by its fine appearance.

Cha—common fowl, generally small in Thibet, and there is no large kind as in Sikim where the fowls are remarkably large.

Damjha—ducks. Not eaten by the Thibetans, but greatly prized by the Chinese, for whose use only they are bred near and in Lassa.

Damjha Cheemoo—goose. Not eaten by the Thibetans, but much liked by the Chinese.

Gang Sir, Gung Kur, Chaloong, Toong Toong—Comprise the numerous wild fowl, swimmers and waders, which migrate from India in March and April, and return in October and November ; they are all eaten, but not extensively. There is a sort of prejudice against killing them ; but as they all breed on the lakes and rivers of the country and are most numerous, the eggs are found in great quantities, the people who live by gathering and selling these eggs never

rob a nest of *all* its contents, but take about half the eggs. This forbearance arises from the general aversion to taking life which prevails in Thibet, and it has its reward as it is supposed that the birds if entirely deprived of their young, would not again return.

Chungoo—a wild dog, reddish colour.

Koong—the Civet, is brought from China and inhabits the Chinese borders of Thibet. It is mottled rather than striped.

Sik—leopard. Thibet or contiguous countries.

Tagh—tiger, ditto ditto.

Somb—bear. A red and a black species.

Nehornehu—a large sheep, or goat, or antelope. I do not know which, is found in the very rugged mountains north of the Yaroo river, and in the neighbourhood of the salt mines or lakes. Is four feet high, has very large horns, sloping back, and four feet long, has a tail 15 inches long, is shaggy, and of various colours, sometimes black and red.

No leeches, mosquitoes or peepsas in Thibet; and maggots or flies are never seen there. There are no bees or wasps in Ding-cham or Thibet proper. In the valley of Choombi, a good deal of fine honey is found, which is exported to Thibet.

The lakes in Thibet are full of fish, one kind only is described, it grows to the weight of 8lbs.; it is named “choolap,” it is not well flavoured or delicate. I have sent specimens of it to the Asiatic Society of Calcutta, and by Dr. Hooker to Sir J. Richardson. Enormous quantities are taken by the hand in the winter season; when the lakes are frozen over, a hole is made in the ice to which the fish immediately rush, and are then pulled out by the hand. Salt is not used to preserve fish, they are gutted, split up, the tail put in the mouth and allowed to dry in the open air, they keep in this way for a year. The principal lakes on this side the Yaroo are Yamdo Yeumtso, Ramchoo, Kala, and Chomotetoong near Dobta.

Sheep grazing, &c.

The number of sheep in Thibet is extraordinary. The flocks are immense, and a person of no consequence whatever will have 2,000 or 3,000 sheep. The large owners have as many as 7,000. The fleece is taken once a year in May or June. The ewes breed twice a year. The great lambing season is in April and May. The other

in October and November, many of the autumn lambs die from the cold, but this is not considered any great loss as the skins are so valuable. A cloak of lamb skins made of fourteen skins is worth 25 Thibet rupees or 10 East India Company's Rupees.

The rams remain with the ewes always, but after the ewes are in young, the rams have a sort of breeching put on. My informant's notion is, that this is done to prevent annoyance to the pregnant ewes, but I suspect that they are kept in this way, until the proper season for letting them to the ewes. The allowance of rams is two or three for every hundred ewes. The males are gelded when quite young or up to a year old, the prices vary from 5 to 7 Thibet Rupees per head, i. e. 2 to 3 rupees of ours.

The Government dues on sheep farms is 10 per cent. in kind every three years, this is in addition to a general tax of 1 rupee per door on all houses per annum.

During the summer season, but little fresh meat is used. The Thibetans do not like it boiled, and are not partial to it raw unless it has been dried. In November there is a great slaughtering in the towns, and a wealthy man in the country will kill two hundred sheep at this time for his year's consumption, the animal is butchered, skinned and gutted, and then placed standing on its feet in a free current of air. It becomes in a couple of days quite hard, and white, and is then ready to eat. It is kept in this way for more than a year, and undergoes great vicissitudes of climate without spoiling. I have seen it at Darjeeling in the rains quite dry and hard, and in no way decomposed. When long exposed to the wind of Thibet it becomes so dry, that it may be rubbed into powder between the hands. In this state it is mixed with water and drank, and used in various other ways. The Thibetans eat animal food in endless forms, and a large portion of the people eat nothing else.

The livers of the sheep and other animals are similarly dried or frozen and are much prized. To a person unused to the dried meat of Thibet, the liver is represented as peculiarly distasteful; it is bitter, and nearly as hard as a stone.

The fat is simply dried, packed in the stomachs, and thus sent to market or kept for home use.

The skins furnish clothing for the working classes and servants. All classes in Thibet put on furs of some kind at the commencement of the winter. It is not reckoned reputable to kill your own meat, and therefore every hamlet has its professional butcher. In towns it is a great trade from the enormous quantity of meat consumed. Some butchers will have five hundred carcases dried and ready at their stalls. The trade of a butcher—Shempa—is hereditary and strange to say a despised one.

The horns of animals are not turned to any useful purpose in Thibet. Small houses are built in the suburbs of Lassa with horns and clay mortar. Goats are also reared in considerable flocks, but principally on account of their milk. The flesh of the sheep is infinitely preferred. The milk of yaks, cows, sheep and goats is used alike for making dried curds, and the various preparations of milk used by these people. The milk of mares does not appear to be used at all in Eastern Thibet, although ponies are extensively bred there. The number of other cattle renders it unnecessary. Fowls are of a small breed, and are reared with some difficulty. The large fowls of Sikim and Bootan are much prized there. The Thibetans do not care about fowl as an article of diet, and it is only since the period of the Chinese supremacy that fowls, pigs, or fish have been used by them. Even now in the places remote from Chinese posts pork and fowls are not to be had.—The Chinese must have pork, eggs, and fowls, and around Lassa, Giangtchi, Digarchi and other places and their stations, these are reared for Chinese consumption.

Diseases.

In July and August severe fevers are not uncommon. Cholera is not known; dysentery is, and is often violent, sometimes proving fatal in four days. Cough and diseases of the chest are not prevalent.

Ophthalmia is very prevalent and very severe. Itinerant ocalists go about the country and are in good repute: they never perform operations, but cure by application of unguents and washes. Three days travelling in the snow without hair-blinds is sure to produce ophthalmia.

Skin diseases are by no means common, although the people are so filthy in their habits. The most dreaded and the most fatal of

all diseases is the small-pox. The people fly the infection, leaving their homes in the most inclement weather. Inoculation is regularly performed annually in the warmer seasons. Two methods are in use, one by incisions on the wrist, the other is effected by inhalation. A plug of cotton which has been impregnated with small-pox virus and dried is introduced into the nose and left there for two or three days, at the end of which the symptoms of the small-pox appear. This method was introduced from China where it is largely practised. Dropsy is rather a common disease, and is generally fatal in the cold season. There is very little Rheumatism in Thibet proper; at Bakchan in Choombi it prevails to a very great extent. There is a malady called the "Laughing disease" which is much dreaded, people die of it. It consists of violent fits of laughing with excruciating pain in the fauces and throat, men and women have it alike and is named "Joomtook" in the language of the country. It frequently proves fatal in a few days, but is not accompanied with fever.

*Report on two specimens of Cuttack Coal from the Talcheer Mines
forwarded by E. A. SAMUELLS, Esq., Commissioner of Cuttack.
By H. PIDDINGTON, Esq. Curator Museum Economic Geology.*

Upon examining the specimens of coal, I find that they are wholly shale, and what is called Top coal, that is coal from the upper and generally inferior beds of a mine.

The shale it is useless to describe, being worthless.

The coal (Top Coal) varies much, some of it being composed of layers in which there are about equal parts of layers of shale of a dull black and of good bright bituminous coal. In other bits, the bituminous coal greatly predominates, and gives good promise that at a moderate depth, a really good coal might be met with. We can say nothing as to what the quantity might be.

The bituminous coal is a bright black glance coal, easily separating into flat sharp rhomboidal fragments in the layers, which in the forceps do not melt or flame, but shoot into singular ramifications which glow for a considerable time: the smell is that of good bituminous coal. It will not coke at all.

An average specimen of such of the coal as was not absolutely shale, and which I take to be Mr. Samuels' Moalpal coal* gives

Water,	14.37
Gaseous matter, ..	17.75
Carbon,	35.62
Ash (dark grey,)	32.25

	99.99.

But the picked specimens of the bituminous coal, which I take to be his Gopalpersad sort? gave a far better result; or rather a very good one which was

Sp. Gravity,	1.42
Water,	3.25
Gaseous,	36.90
Carbon,	51.75
Ash (fawn coloured,)	8.00

	99.90.

This kind of coal then, if a vein or bed of it can be found, is about equal to the good Ranneegunge, but at present the *average* of the coal would not be worth sending to Calcutta for a trial on a large scale as Mr. Samuels enquires; and all that should be done is, to sink a shaft for a good vein. Nothing but the existence of coal and the *promise* of good coal can be predicated from surface diggings on the out-crops of the upper beds only; and in sinking such a shaft, a merely good vein as to quantity and quality should not satisfy the miner, but the shaft should be carried as deep as possible to be certain that the best coal does not lie below; for the best coal is in the end always, the most economical to work.

* The specimens have unfortunately no labels with them, though in two separate packages.

Literary and Miscellaneous Intelligence.

Professor Eastwick has addressed us the following letter on the subject of the criticisms by the Westminster Review of the new Edition of his translation of Bopp's Grammar. He certainly could not have adduced stronger testimony than he has in favour of his character as a translator.

Haileybury College, March 15th, 1855.

SIR,—I observe, in a late Number, you have noticed my new edition of Bopp's Comparative Grammar with the remarks made by the Westminster Review. Will you permit me to state that those remarks are *malicious* and *untrue*. In the first place only the 1st Volume of the 2nd Edition has appeared, whereas they wilfully mistake the old Edition of the 2nd and 3rd Vols. for a new Edition. Secondly, they wilfully insist on misprints as mistakes. E. g. in one instance J. Grimm's name which is quoted hundreds of times is misprinted F. Grimm, and they maliciously assert that it perpetually recurs in this erroneous manner of writing. They pretend that I have made Dümmler the Berlin Printer, the Author of some of Bopp's works, simply because in a few cases, where Bopp's refers to them in these words "*in meiner Abhandlung*" (Berlin, bei Dümmler) I have translated "in my treatise (Berlin, by Dümmler)" meaning, published by Dümmler, where there could be no possibility of a mistake.

It would occupy too much of your time, if I was to go through the eight or nine passages, which they have brought forward—*seriatim*, but I hope it will be sufficient to quote the words of *Professor Bopp himself*, of Professor H. H. Wilson and of Dr. Max. Müller, the three perhaps greatest philologists living. The first says, "I am perfectly satisfied with your translation, and have reason to thank you for its clearness." Prof. Wilson says, "the translation has been made with great scrupulousness and care, and it has required no ordinary pains to render in English, with perspicuity and fidelity, the not-unfrequently difficult and obscure style of the original." Dr. M. Müller says, "I have frequently compared your translation with the original, and I can conscientiously say, that few books have been so faithfully rendered into English from German

as this." If, then it appears to the Society, that I have been unjustly treated by the Review they have been pleased to quote,—I trust they will make me amends by publishing this letter in their journal.

I have the honor to be, Sir,

Your obedt. Servant,

EDWARD B. EASTWICH, *Professor E. I. College.*

In a letter received from Major Cunningham, shortly before his departure for England in April last, he announces the discovery of several new coins, "of which the most remarkable is," he says, "an Indian coin of Sapor. The name is written distinctly. The coin is a silver one, of the Kabulian type of Indo Sassanians. I presume that the coin must have belonged to Sapor the second, whose long reign was so successful against the Romans in the West."

He further mentions a Gold Kanerki with the reverse of ΟΡΛΑΓΝΟ and a bad duplicate of the hitherto unique tetradrachm of Diodotus.

Both Major C. and Mr. E. Thomas, on close examination of the facsimile of the Thaneswar inscription translated by Baboo Rajendralal Mittra, in a paper published at p. 673 of vol. XXII of our Journal, pronounce it to be "beyond all doubt a middle age one—that is," says Major C. "the forms of the letters are those of the 11th and 12th centuries. I read the date ११९० S. or ११३३ A. D." The Baboo professed only to read the inscription as it stood on the fac-simile before him: it must be admitted that the character in which it is written is a truer clue to the date than can be given by the best reading of the figures representing the date. But we shall shortly publish the fac-simile with a view to inviting further discussion of the true date of the inscription.

The Stacy collection of coins has been catalogued and valued by Mr. E. Thomas at Mussooree and has been offered to the British Museum.

It is gratifying to find that the N. W. Government has favourably entertained a project, by Mr. Thomas, for publishing in a series the texts of all Persian Historical works on Hindustan.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,

FOR APRIL, 1855.

The Society met on the 4th instant, at half-past 8 p. m.

SIR JAMES W. COLVILE, Knight, President, in the chair.

The proceedings of the last month were read and confirmed.

Presentations were received—

1. From J. Hodges, Esq. a spear and throwing stick from Swan River Settlement, Western Australia.

2. From Colonel Baker, 21 Indo-Bactrian copper coins.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members.

W. G. Young, Esq. C. S.

Babu Kalichurn Roy.

Captain C. B. Young, Beng. Eng.

His highness Muhammed Hossain Alí, Ex-Amír of Scinde was named for ballot at the next meeting, proposed by Sir James Colvile, and seconded by Mr. Grote.

Read a letter from Dr. Clarke expressing his wish to withdraw from the Society.

Mr. Houstoun gave notice of his intention to make the following motions and enquiries at the next meeting, viz.

1. To have laid before the meeting all notes or comments relating to the introduction or cancellation of any introduction to No. 80 of the *Bibliotheca Indica*.
2. To request that Mr. H. V. Bayley, be requested to accept the Joint-Secretaryship of the Asiatic Society.
3. To know what communications are, as a matter of course, and in what stage, to be laid before the Society, and for what communications the Society must depend upon the Council.

4. To know by whose advice and authority the niche has been made in the Society's meeting room, to the obstruction of a proper circulation of air.

Communications were received—

1. From the Government of India, enclosing extract from a despatch by the Hon'ble the Court of Directors, together with observations by Dr. Royle, on the Graphite or Plumbago of Kumaon and Travancore.

2. From Dr. J. Fayerer, Lucknow, Meteorological Registers kept at the Lucknow Residency for the month of August to December, 1854.

3. From Bábu Rádhánáth Síkdár, abstracts of the results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November, 1854.

4. From Rájá Rádhákánth Deb, communicating his thanks to the Society for having been elected an Honorary member.

5. From Dr. Campbell, a note on the Limboo alphabet, by Captain Mainwaring.

6. From Lieut. F. Burton, in command of the Somali expedition, announcing despatch of some specimens collected by Lieut. Speke, 46 B. N. I., and enclosing a descriptive list of the fauna of the Somali country.

The following is an extract from Lieut. Burton's letter which is addressed to Mr. Blyth, the Curator of the Zoological Department of the Museum.

"On the 18th October, 1854, Lieut. Speke, by my direction, landed at 'Goree Bunder' (as our maps call it) in the country of the Warsangeli, a large sub-family of the Somali nation. After much trouble and detention on the coast—carriage being with great difficulty purchasable in that part of Eastern Africa—Lieut. Speke started inland towards the Wady Nogal.

"The country traversed by Lieut. Speke along the coast was a tract of sand and limestone, thinly overgrown with jungle. Water was scarce, only one well of pure water being found. Animals did not abound, a few hyænas, and jackals, gazelles, the gúrnuk (gunnouk) antelope, and a little land antelope were discovered. Besides gulls, there were very few birds.

"The distance across the plain from the sea to the mountains, varies from half a mile to two miles. On the 18th November, Lieut. Speke ascended the hills by the bed of a mountain-stream, the only 'Pass' known

in these wild countries, and on the 21st he reached an encamping ground called Adda near the top of the mountain. Here his thermometer (which at the level of the sea boiled at 214°) boiled at $204^{\circ} 15'$, shewing an altitude of about 5,500 feet. The highest point reached is denoted by $200^{\circ} 15'$. These mountains are covered with a thin scrub of acacia in the lower folds. The upper summits are thickly clad with jungle, amongst which grow trees, and a kind of pine called by the Arabs سنوبه (sinanbar), and by the Somalies دَبَّس (dazzib) were conspicuous : Lieut. Speke recognized this tree as familiar to him during his Himalayan wanderings. This vegetation however is confined to the northern or seaward face of the mountains : the southern slopes are bleak and bare. The beasts are rhinoceros (single-horned), a large deer called 'godí,' gazelles, the 'alakud' antelope, a few leopards, which the Somalies fear greatly, and hyenas (none of which were seen). The birds were chiefly hill rock-pigeon and a description of brown partridge. These hills are covered with fossil shells, denoting a lime-stone formation.

"On the 4th December, Lieut. Speke began to descend the southern slope of the mountains which fall about 2,500 feet, the thermometer boiling at $205^{\circ} 30'$. This is the undulating plateau 'above the ghats' which forms the country of the Somalies, Lieut. Speke believes the slope to be from north-west to south-east, and doubts any depression towards the Wady Nogal or due south. The southern side of the mountain drops in steps or terraces, and was then almost devoid of verdure. Water was scarce and brackish : a few superficial springs are scattered about the country, and the depth of the wells or rather the holes in which water is found, is sometimes as great as 60 feet.

"Arrived at 'Rhat,' the most favoured spot in the Warsangeli country, Lieut. Speke found the Kraals of the Nomades numerous, and some interesting ruins said by the people to be of Christian origin. Thence the traveller turned westward and being prevented by the unsettled state of the country and the drought, which at this season is always a formidable obstacle in the eastern parts of Africa, he returned to 'Goree Bunder' and thence embarked for Aden.

"The collection of specimens made by Lieut. Speke embraces the different varieties common to the maritime plain, the ghats, and the plateau above the mountains. A few sparse notes and notices of the habits and habitat of the animals, together with their Somali names, may perhaps be interesting and assist so distinguished a naturalist as yourself in preparing an account of them for publication. May I be allowed to mention that Lieut. Speke has been himself most zealous in collecting and preparing skins, even under the most adverse circumstances, and that during

our future wanderings we shall have (it is expected) greater opportunities of labour in the field of investigation."

7th. From Mr. Secretary Beadon, forwarding a Report (by Mr. Marcadieu) on the ferruginous resources of Kooloo, together with some specimens.

8th. From H. Piddington, Esq. submitting the following papers.

1. A Report on the Cherrapunji Coal.
2. A ditto on the Coal from Talcheer in Cuttack.
3. A ditto on the Kunkurs and Iron stones of Burdwan.

9th. From Dr. Sprenger suggestions and observations for the improvement of the *Bibliotheca Indica*.

The Curators of the Museum and the Librarian submitted their reports of additions made to their Departments during the month of March last.

Report of the Curator, Museum of Economic Geology, March, 1855.

GEOLOGY AND MINERALOGY.—We have received from Dr. Campbell, Resident of Darjeeling, a series of 34 specimens of rocks collected by that gentleman near the Cholamoo lake in Thibet, on his mission to that country in October, 1849.

It will be recollectcd that Captain Sherwill in sending us a specimen of the meteorite which fell at Segowlee, mentioned in my last Report, said that he had obtained it from Mr. Glover of the C. S. who had a larger fragment. Learning from him that that gentleman was in Calcutta, I called upon him and he was good enough to promise me another piece for the Society. This fine specimen is now on the table and on comparison with the Allahabad meteorite, it will be seen that they much resemble each other as to their earthy matrix. The Segowlee specimen however, containing numerous white grains (probably sulphuret of nickel) while the Allahabad stone contains evidently fragments of meteoric Iron imbedded.

ECONOMIC GEOLOGY.—I have put into the form of a paper for the Journal my examination of a specimen of Coal from Cherrapunji from a new mine opened by Mr. Inglis and forwarded to us by Messrs. Gilmore and McKilligan, which is not only a first rate gas Coal, but has disclosed some remarkable peculiarities in its coking, which for the present, are very unaccountable.

I have also put into another short paper my examinations of some of the Burdwan Kunkurs, with reference to their applicability as a flux in

the smelting of the iron ores of that district, as shewn by Mr. Taylor of Toposi Collery in his specimen of iron smeltings.

Mr. Pontet has sent me a specimen of a supposed copper ore from the Railroad cuttings in the Damun-i-koh, but it is nothing more than a red and green Jasper with specks of arsenical pyrites (mispickel) which give in some places a bright metallic streak resembling silver.

Dr. Campbell has forwarded specimens from the further working of the Pushak copper ores already alluded to in my Reports and in the paper on them vol. xxiii. p. 477 of the Society's Journal requesting an opinion as to whether there was any improvement. The only one, which appears evident is that the matrix is somewhat softer.

From E. A. Samuels, Esq. C. S. Commissioner of Cuttack, I have received a letter which gives the following account of his visit to the Coal fields of Talcheer on the Brahmee river.

"I returned from the jungles yesterday and hope by to-day's dak-banghy to send you my first specimens of Coal, iron, iron-stone, &c. The number of the Journal containing Kittoo's researches has never reached me, and I do not know therefore whether I can communicate any thing to the Society with regard to the Talcheer and Ungool coal beds with which they are not already familiar; I may mention shortly to you the route which I took and which will enable you to judge. From Cuttack I proceeded through Dhemkond to Balpore on the Brahmee; there I was told that coal existed in the neighbourhood and sending off a party of workmen in advance, I started after breakfast for the locality, a village called Kangriapara about three miles from Balpore, but when we got near the place we were met by the ominous announcement that the coal was so hard it had turned the points of all the crowbars, and that no one could make any impression on it. On arriving at the spot, the mystery was explained. The supposed coal was a large mass of quartzose rock (No. 7 of the specimens) which thrust its surface blackened by the forest fires which annually swept over it to a height of 20 or 30 feet above the surrounding soil. It was so hard, that I broke my hammer in securing a specimen. At Kumlong about 25 miles further up the Brahmee, I found drift coal in the river opposite the mouth of a nullah called the Nunderajore and immediately below a singular barrier of rock called Jetea Ghatee which is here thrown across the bed of the river. There was no coal in the environs of this barrier or above it, so that I concluded the coal must have been brought down the Nundera, but I could not hear of any coal in that direction; cliffs of a clayey slate are common along the upper part of the stream which I afterwards crossed, but every one assur-

ed me that coal was unknown. I was particularly anxious to discover where this coal came from, because we tried it in camp and found it remarkably good; unfortunately relying upon procuring more next day, in which I failed, we burnt all that I had picked up. The coal bed I explored near the Talcheer Raja's, was the same which Messrs. Beetson and Kittoe had examined at different times. It is situated in the bed of the Bilyejore at the village of Moalpal about two miles above the Raja's residence, a coarse sand stone is the prevailing stone throughout the neighbourhood. The spot where Messrs. Beetson and Kittoe had dug, was pointed out to me, but I preferred breaking new ground and choosing a spot several hundred yards further up, I dug down from the top of the bank, some 12 or 14 feet high, upon the bed. We found first about a foot of peaty substance-like coal, but so soft that you could thrust a stick through it, then coal shale below, which was indifferent coal much mixed up with shale; about 8 or 10 inches below which was a hard slaty rock. The whole bed 5 or 6 feet in thickness, I left a man to bore through the slate and he came to a few inches of coal (specimen No. 10), and below that slate again. The coal is visible on the left hand bank of the nullah for about half a mile, and it might be worth while to sink a shaft at some little distance back from the nullah, when better coal than that obtainable so close to the water, might be procured. If coal exists here of good quality, it would pay well to work it, as there is water carriage down the Brahminee to Point Palmyras; and the Dhamrah river, if the outer channel is properly buoyed off, is accessible to steamers and vessels of 500 or 600 tons. Gopalpersad is from 16 to 20 miles inland from Talcheer, that is inland from the Brahminee river. It stands on a wide torrent, called the Sengra which never has much water, and is usually dry. For several miles above Gopalpersad and about a mile below it the right bank presents a succession of stratified coal cliffs, which have an exceedingly curious appearance; the jungle in rear of these cliffs in many places, presents the appearance of a coal-field such as one is accustomed to see in Durham or Northumberland the whole ground being covered for considerable distances with coal shale and dust. I saw Beetson and Kittoe's excavations, but dug further back and deeper than either of them. The appearance of the coal about six feet back from the river and two or three feet below its bed was excellent; hard, sparkling and much less laminated than the more exposed coal on the cliffs. I marked out a place in the jungle also about 100 yards from the river above the village, when I ordered a pit to be sunk, but going away myself to the village of Kunkerei to see the iron works there, the coolies, to save themselves trouble, commenced on one of

the cliffs close by, and it was not until I was on the eve of departure, that I discovered the mistake. I send you specimens of this coal, and will write you officially regarding it. It will depend on your report whether I send up any large quantity to Calcutta for trial or not. The iron, I send, is from Kunkerei, a village in Ungool, close to the very extensive coal field of Gopalpersad. I have had sketches made by a friend of their process, and also of the Gopalpersad coal cliffs, which I will send you by and bye, the process is most primitive, but the iron bears a high character, 18 seers of the impure iron as I send it you, are sold at the furnace for one rupee ; when freed from impurities and well hammered it fetches in the Cuttack bazar, a rupee for 8 seers. The axes and chisels made of it in Cuttack are excellent, *no flux whatsoever is used*. The charcoal is made from the Sal (Shorea robusta) I brought a large package of it with me ; but my idiot of a bearer choose to think it was of no use and threw it away or cooked his dinner with it. I send you a good deal of slag which I picked up about the forge, I have plenty more if you require it. I had no time to go to the gold regions in Paldeyra ; as it is I start again on the 16th for Bood, and shall not be under cover I fancy before May."

The specimens and sketch alluded to, have also reached and are upon the table, and I have examined the coal of which also a detailed report is drawn up for the Journal : the iron ores I have not yet had time to examine.

From Lieut. W. D. Short, Executive Engineer, Midnapore, I received a minute portion of gold dust and gold sands with a request that I would examine them. The following is an extract of my letter to him from which it will be seen that there exists in the gold sands of that district something which would resemble a new mineral, but with such excessively minute specimens nothing very positive can be announced.

" First your gold *dust* contained minute bits of copper, no doubt adulterations? unless you saw them washed out before you in which case they must be native copper ?

" Then, in the gold dust and in the washed sand, I found some very minute (pin's head) particles of a mineral which was yellow-white, malleable, and tough ; would not amalgamate with mercury ! and was excessively difficult of solution in boiling Aqua regia !! though it certainly contained gold!!! What else I was unable to determine, but am inclined to think it may be a sulphuret of gold, a mineral not yet found to exist though gold is found in iron pyrites (sulphuret of iron) where it is therefore *supposed* to exist as a sulphuret.

" All this upon minute pin's-head bits (three of them I think) in watch-glasses, and results watched by a magnifier ; so we can say nothing more

positive than as above. I could only trace in the whole of the solutions a doubtful trace of platinum; none of palladium or rhodium.

"But I have now to request that you will, if possible, obtain for me, say at least a quarter of an oz. of the gold dust *from the same locality*, and a quarter of a lb. of the washed sand, the cost of which I shall be glad to pay as you may direct, if you cannot put it into a contingent bill; but if possible I should be glad that it should be washed out before a confidential person, should you not be able to attend to it yourself. Mr. Samuels informs me that the gold-washers thereabouts do not use mercury as they do in the N. W. Provinces. I despatch however to you, per dawk, a pamphlet on the method of saving the greater part of the mercury, but if this new compound exists in any quantity that may be the reason why they do not use mercury. The Burmese are said to throw away the platinum, calling it Devil's metal, i. e. because they can do nothing with it. Do your washers know any thing of any *Shaitan Ka gotee* in their products?"

From Dr. Campbell of Darjeeling we have received two specimens of Copper Ore, being one from his farther diggings at Pushak, an ore already examined as above and another from a new locality called Mahaldiram.

My reply to his letters, is as follows:

A. CAMPBELL, Esq. *Darjeeling.*

SIR,—I have, as you requested, examined the specimens from the farther workings of the Pushak Copper Vein, and I think (differing herein from you,) that there is an evident improvement though not in the ore, yet in the matrix which seems much softer, and I have moreover picked from amongst the specimens two or three small fragments approaching to the pavonine or peacock ore of the Cornish miners which is much richer in copper than the common pyrites. If you reach a vein or bed of this, you may probably find something well worth your search.

The Mahaldiram specimens are, as to abundance, a much more promising ore; though as with the former Pushak, its matrix is tough and in some parts siliceous, but there are good sized lumps of massive ore which make it altogether a far better vein to work at present, than the Pushak, supposing both to be of pyrites only.

I must not, however, forbear to repeat to you that surface indications are next to worthless, till a shaft of some depth has been sunk. I should sink as deep, or drive a gallery as far, as the workmen will go; for these poor ores often overlie much richer deposits of copper; and in America even of silver!

H. PIDDINGTON,

Museum, 19th Jan., 1855.

Cur. Mus. Eco. Geology.

From a friend in China Lt. Conover U. S. Store ship *Supply*, I have received a specimen of Coal from Japan, and one from Killow in Formosa, both of which are good looking Coal. We had no Coal from the Eastward farther than from China hitherto in the Museum, so that these specimens are great prizes.

We have received an imperfect crystal of native sulphur from Persia, presented by Mr. J. B. Lawson.

We have also received from Mr. Pontet, a fine specimen of Umber. The locality is not stated in that gentleman's letter, which he dates only from the "Jungles," but which I suppose to be situated in the Damun-i-Koh. He says it is embedded in the hill side at about 1000 feet elevation, and that there is evidently a very large vein (bed) of it; what is exposed may be five feet thick.

Report of Curator, Zoological Department, for April Meeting, 1855.

I have now the pleasure to acknowledge and report upon a fine collection of skins received from Dr. E. Rüppell of Frankfurt: a collection which has afforded the long sought opportunity of actually comparing sundry Indian and E. African birds together; and the results of such comparison I proceed to lay before the Society, while I distinguish the numerous species which are new to its museum by prefixing an asterisk to each name.

MAMMALIA.

**CERCOPITHECUS ENGYTHITHIA*, (Herm., apud Gray; *C. griseo-viridis*, Desm.; &c.) Abyssinia.

**CANIS VARIEGATUS*, Rüppell. Abyssinia. (Skull wanting.)

**VULPES VIRGINIANUS*, (Gmelin: *V. cinereo-argentatus*, Richardson). N. America.

**SCIURUS MULTICOLOR*, Rüppell (*Sc. cepate*, A. Smith). Abyssinia. (Skull wanting.)

**XERUS SETOSUS*, (Forster; *Macroxus leuco-umbrinus*, Rüppell; &c.). Abyssinia.

**PSAMMOMYS OBESUS*, Rüppell. Egypt.

**FIBER ZIBETHICUS*, (L.) N. America.

**POTAMOCHERUS AFRICANUS*, (Schreber; *Sus chæropotamus*, Desmoulin; *S. larvatus*, F. Cuvier). Skin, without skull. From S. Africa.

**COASSUS NEMORIVAGUS*, (F. Cuv.; *Cervus simplicicornis*, Illiger). Doe, from S. America. (Skull wanting.)

AVES.

**PÆOCEPHALUS MEYERI*, (Rüppell). Abyssinia.

**AGAPORNIS TARANTA*, (Stanley). Abyssinia.

**CIRCUS RANTIVORUS*, (Daud.) Africa. Two specimens.

**SPIZAETUS OCCIPITALIS*, (Daud.) Abyssinia.

**AQUILA NÆVIOIDES*, (Cuv.; *Falco senegalus*, Cuv.; *F. rapax*, Temminck; *F. albicans*, Rüppell; *Aq. choka*, A. Smith). Abyssinia. This African bird is considered by Mr. G. R. Gray to be identical with the Indian *Aq. FULVESCENTS*, Gray (v. *Aq. fusca* et *Aq. punctata*, Gray, et *Aq. vindhiana*, Franklin). The specimen sent by Dr. Rüppell has much larger and more powerful legs and talons, and is altogether a stouter and stronger bird, than its Indian near affine; for which reason we consider it to be a distinct species.*

**HALIAËTUS LEUCOCEPHALUS*, (L.), in immature plumage. N. America.

MILVUS EGYPTIUS, (Gm.: *Falco Forskali*, Gmelin; *F. parasitus*, Daud.; *F. parasiticus*, Latham). Egypt. Identical with a specimen from S. Africa, presented by Capt. Sherwill; and readily distinguished from the other dark-coloured Kites by its yellow beak.

**POLYBORUS BRASILIENSIS*, (Gmelin). Chili.

**GYPUS RUPPELLI*, C. L. Bonaparte. (*G. Kolbei* apud Rüppell). Fine adult, from Abyssinia. Upon a former occasion (*J. A. S.* XIX, 502), we called attention to the great difference of opinion among the best ornithologists regarding the specific unity or distinctness of various races of Vulture, which have been comprehended under *G. FULVUS*, (L.). About the same time, the Prince of Canino published his matured opinion on the subject, in the *Rev. Zool. &c.*, 1850, p. 447; and we feel satisfied of the correctness of his views. His highness recognises,—1, *G. FULVUS*, (L.), of Europe (and we may add the high mountains of Asia, as the Himalaya).†—2, *G. OCCIDENTALIS*, Schlegel (v. *Kolbei* apud Temminck, *Man. d' Orn.* IV, 587), of the Pyrenees, Sardinia, and the Barbary States.—3, *G. RUPPELLI*, Schlegel (*vulgaris?* C. L. Bonap., *ibid.* p. 242, v. *Kolbei* apud Rüppell), of E. Africa.—4, *G. KOLBEI*, (Daudin), founded on the S. African *Chasse-fiente* of Levaillant.—5, *G. INDICUS*, (Scopoli, v. *tenuiceps* and *tenuirostris*, Hodgson), of India and the Malay countries. And 6, *G. BENGALENSIS*, Gmelin, of India (and also E. Africa, according to Rüppell). Our museum now possesses the whole of these, with the exception of *G. KOLBEI* of S. Africa: and there can be no doubt of the distinctness of the others. With the exception of *G. BENGALENSIS*, all are very remarkable for possessing 14 rectrices.‡

* We also exceedingly doubt the alleged identity of the Indian *BUTEO CANESCENS* with the Nubian *B. RUFINUS*.

† In Macedonia, this species was noticed by Capt. Drummond to be "most numerous in the plains as well as the mountains." *Ann. Mag. N. H.* XVIII, 10.

‡ In *G. FULVUS (verus)*, which is the 'great White Vulture' of the Himalaya,

**NEOPHRON PILEATUS*, (Burchell; *N. carunculatus*, A. Smith; *Percnopterus niger*, Lesson; *Cathartes monachus*, Temminck). Abyssinia.

**CATHARTES AURA*, (L.) Chili.

BUBO VIRGINIANUS, (L.) N. America.

**PROMEROPS CYANOMELAS*, Cuvier. Abyssinia.

HALCYON SENECALENSIS, (L.) Nubia.

**MEROPS CÆRULEOCEPHALUS*, Latham. Abyssinia.

**M. LAMARCKI*, Cuvier (*M. viridis* apud Rüppell). Two specimens, from Abyssinia. This differs from the Indian *M. VIRIDIS*, L., in having much more ferruginous on the wings, extending across both webs of the primaries and secondaries; and the throat is yellowish-green, tinged with ferruginous, having scarcely a trace of verditer except on its extreme

the clothing plumes generally are elongated and lanceolate at all ages; and those covering the craw are pale or whitish. It is also a larger bird than the others; the closed wing of a young Nepalese specimen measuring 33 inches.

In a fine adult of *G. OCCIDENTALIS*, from Algeria, the closed wing measures but 27 inches. The clothing feathers are much less acuminate than in *G. FULVUS*, and resemble those of *G. RUPPELLI* in form; but their colour is throughout dull pale isabelline, slightly tinged with ashy excepting round the margins; and the hue of those covering the craw is much darker.

In the adult *G. RUPPELLI*, the whole plumage is fuscous, with strongly contrasting whitish margins more or less broad, imparting a handsome variegated appearance, especially to the scapularies and coverts of the wings and tail: feathers covering the craw blackish; and those forming the white ruff shorter and more dense than in either of the preceding. Length of wing 24 inches.

As we have all ages of the affined *G. INDICUS* for reference, we observe that its feathers are not more or less acuminate according to age; and in the young of this species and of *G. FULVUS* (and doubtless of the others also), the feathers of the upper-parts have a medial pale streak, but not the broad whitish margins which distinguish the adults of *G. RUPPELLI*.

In *G. RUPPELLI*, the beak is somewhat broader in proportion to its length than in *G. FULVUS* and *G. OCCIDENTALIS*, resembling that of *G. BENGALENSIS* except in having its ceral portion more prolonged backwards; while *G. INDICUS* has a comparatively slender bill, especially as viewed laterally, with its ceral portion remarkably elongated. In a particularly fine adult of *G. INDICUS*, the closed wing measures $24\frac{1}{2}$ in.

Good Himálayan specimens (skins) of the adult and young of *G. FULVUS*, with skeleton; and skeleton also of *VULTUR MONACHUS*, the 'Great Black Vulture' of the Himálaya; and of the *GYPAËTOS*, popularly mis-called 'Golden Eagle' by English residents;—would be very thankfully received for the Society's museum.

lateral margin bordering the black eye-streak, and very little of it even there.

DENDROBATES GOËRTAN, (Gm. ; *D. poiocephalus*, Swainson). Two specimens, from Nubia.

*CAMPETHERA NUBICA, (Boddäert); *Picus punctatus*, Cuv. ; *P. notatus*, Lichtenstein. S. Africa.

*C. ETHIOPICA, (Hemprich). Two specimens, from Abyssinia.

*LÆMODON BRUCEI, Rüppell. Abyssinia.

*L. UNDATUS, Rüppell. Abyssinia.

*L. MELANOCEPHALUS, Rüppell. Abyssinia.

*BARBATULA CHRYSOCOMA, (Temminck). Abyssinia.

*TRACHYPHONUS MARGARITATUS, Rüppell. Abyssinia.

*TURACUS LEUCOTIS, Rüppell. Abyssinia.

COLIUS SENEGALENSIS, L. Abyssinia.

*C. LEUCOTIS, Rüppell. Two specimens, from Abyssinia.

*OXYLOPHUS AFER, (Leach, = *Levaillantii*, Swainson, and *ater* apud Rüppell; nec *ater*, Gmelin, which = *SERRATUS*, Sparrman, a common Cape species, which the late H. E. Strickland received from Kordofan).* Specimen from Abyssinia. Throat and fore-neck black, the feathers laterally edged with dull white, which gradually increases downward; the black predominating much more than as represented in Swainson's figure (*Zool. Ill.* 2nd series, Vol. I, pl. 13), and spreading downward over the breast and flanks.

*CENTROPUS SUPERCILIOSUS, Rüppell. Abyssinia.

*CAPRIMULGUS ISABELLINUS, Temminck. Ditto.

*CORVULTUS CRASSIROSTRIS, Rüppell. Ditto.

*CORVUS PHÆOCEPHALUS, Cabanis. (*C. scapulatus* apud Rüppell.†) Ditto.

*LAMPROTORNIS CYANVENTRIS, nobis, n. s. : *L. nitens* apud Rüppell, from Abyssinia; nec *NITENS* (L.), of S. Africa, from which it differs in having a conspicuously shorter bill, and in various details of colouring. In *L. NITENS* (*verus*), the whole plumage is glossy *aeneous* or steel-green, brightest on the wings, and mingled with steel-blue on the head and neck: the abdominal region being of the same hue as the back, but an admixture of steel-blue is observable on the tibial plumes, axillaries, and

* Vide *P. Z. S.* Nov. 26, 1850.

† Vide the Prince of Canino, in the *Comptes Rendus*, tom. xxxvii (1853), p. 829. This Abyssinian specimen, however, accords precisely (even in measurements) with Swainson's description of *C. CURVIROSTRIS*.—? (nec Daudin, v. *leuconotus*, Sw.), of W. Africa, which is stated to be distinct from the nearly affined *C. SCAPULATUS*, Daudin, of the Cape; while another, of similar colouring, will stand as *C. MADAGASCARIENSIS*, C. L. Bonaparte.

under wing-coverts: shoulder of the wing (under the scapularies) bright steel-blue or purple, tipped with amethystine, which forms a distinct bar. In *L. CYANVENTRIS* the upper-parts are glossy steel-green, uniform on the crown, nape, and back, but passing to bluish on the rump and upper tail-coverts, and also on the ear-coverts; throat and breast like the back, but the belly and thighs are brilliant steel-blue mixed with amethyst; as likewise the axillaries and under wing-coverts, which are very brilliant, the amethystine hue prevailing: shoulder of the wing (under the scapularies) steel-blue, with no terminal amethystine bar as in *L. NITENS*, but a little of this colour shewing at the bases of the feathers. In *L. CYANVENTRIS*, the wings are more uniformly glossed than in *L. NITENS*, extending quite over the tertiaries and primaries; and the wing-coverts and tertiaries have their black terminal spots larger and rounder. In fact, the northern bird approaches in brilliancy to the superb *L. SPLENDENS*, (Leach, v. *L. ptilinorhynchus*, Swainson,) of W. Africa, of which also we possess a fine specimen.

**JUIDA RUFIVENTRIS*, (Rüppell). Abyssinia. This form approximates the Malayan genus *CALORNIS*, G. R. Gray; but the feathers are throughout rounded or not acuminate,

**HYPHANTORNIS AURIFRONS*, (Temminck). Male and female. S. Africa.

**PLOCEUS* —? Male. S. Africa.

**PL. LARVATUS*, Rüppell. M. and F. Abyssinia.

**EUPLECTES XANTHOMELAS*, Rüppell. M. and F. Ditto.

**EU. FLAVESCENS*, (Daud.; *Fringilla phalerata*, Illiger). S. Africa.

**EU. FLAMMICEPS*, Swainson. M. and F. Abyssinia.

**COLIUS PASSER TORQUATUS*, Rüppell. (*Vidua rubritorques*? Swainson). M. and F. Abyssinia.

**VIDUA PARADISEA*, (L.) Two females. Abyssinia.

**V. SERENA*, (L.; *V. erythrorkyncha*, Swainson). Abyssinia.

**AMADINA* (?) *FRONTALIS*, (Vieillot). Abyssinia.

**MUNIA CANTANS*, (L.) Two specimens, from Abyssinia. Affined to the Indian *M. MALABARICA* (v. *Lonchura cheet*, Sykes).

**ESTRElda ELEGANS*, (Vieillot; subg. *Pytilia*, Swainson). Abyssinia.

**E. BENGALUS*, (L.) Abyssinia.

**E. CINerea*, (Vieillot). Abyssinia.

**PASSER SIMPLEX*, (Lichtenstein; *P. Swainsonii*, Rüppell: nec *P. simplex* apud Swainson, which = *P. GULARIS*, Lesson). Abyssinia.

**P. SALICICOLUS*, (Vieillot; *P. hispaniolensis*, Tem.) Female, from Egypt. This species was observed in Afghánistán by Capt. Thos. Hutton, and is not uncommon at Pesháwur. In Kohát it abounds, and is there known as the 'Kábul Sparrow,' (Lt.. Alex. J. Trotter, in *epistola*.)

*EMBERIZA SEPTEMSTRIATA, Rüppell. Abyssinia.

.*SERINUS (?) STRIOLATUS (*Pyrrhula striolata*, Rüppell). Female, from Abyssinia. This bird combines the beak of a CARPODACUS, with the plumage of a Serin, CRITHAGRA, or Siskin. The species of the true Canary-bird type, or CRITHAGRA of Swainson, Dr. Rüppell refers to SERINUS.*

*CRITHAGRA NIGRICEPS (*Serinus nigriceps*, Rüppell). Two males. Abyssinia.

*CR. XANTHOPYGIA (*Serinus xanthopygus*, Rüppell). Abyssinia.

* His *S. tristriatus*, however, we consider to be a PASSER; and may here add, that the *S. aurifrons*, nobis, *Catal.* No. 681, proves to be identical with *Passer pusillus*, Pallas, and will now stand as SERINUS PUSILLUS. We have not the European Serin (*S. meridionalis*, C. L. Bonap.), for comparison; but M. de Selys Longchamps informs us that the beak of *S. pusillus* resembles that of *S. meridionalis* when viewed laterally, but is a little less bulged, as seen from above. The beak of *S. (?) striolatus* is probably even more bulged, as viewed from above, than that of *S. meridionalis*; but we suspect that SERINUS (as founded on the European bird, *Fringilla serinus*, L.) is the modern genus or sub-genus with which it best accords.

S. pusillus has hitherto been only known to inhabit the high mountains of W. Asia; and according to Pallas is common upon the Caucasus and about the Caspian sea. In summer it is found near the snow-line, together with MONTIFRINGILLA NIVALIS and RUTICILLA ERYTHROGASTRA; descending in winter to the sub-alpine regions of Persia. *S. meridionalis* is "common in Asia Minor, visiting the plains in flocks during the winter." (Strickland).

Our specimens of *S. pusillus* were procured by Capt. T. Hutton and by L. C. Stewart, Esq., in the vicinity of Masuri, in different winters; and Capt. Hutton lately informed us, that he had "fallen in with it this winter (1854-5), after an interval of many years. It appeared to be always in pairs, and like our Siskin and Goldfinch is very fond of alighting upon the tall coarse nettles which abound here. They are merely winter birds at Masuri, and seem to have left about the middle of February." In summer, we are informed by Lt. Speke, of the 46th B. N. I., that "it is found in Spiti and Ladakh at an altitude of from 10 to 13,000 ft., but not in such quantities as PYRRHOSPIZA PUNICEA; more than 2 or 3 being seldom seen at a time; and like the Goldfinch they are not confined to a distinct locality."

So far as we can remember, the genus PYRRHULOIDES, nobis, *J. A. S.* XIII, 951, founded on PYRRHULA EPAULETTA, Hodgson, *As. Res.* XIX, 156, is nearly affined to SERINUS, and intermediate to that genus and true PYRRHULA. (*S. pusillus* is the type of the division METAFUNIA, C. L. Bonap., *Comptes Rendus*, XXXVII (1853), p. 917).

CALANDRELLA BRACHYDACTYLA, (Tem.) Two specimens, from Abyssinia. Head less rufescent, and with the dusky mesial streaks to the feathers more developed, than we remember to have seen in Indian specimens: but an example from Algeria differs in no respect from the latter.*

* ALAUDA RUFICEPS, Rüppell. Two specimens, from Abyssinia.†

AGRODROMA SORDIDA (*Anthus sordidus*, Rüppell). Before receiving this Abyssinian specimen, we had provisionally identified the large dull sandy-coloured Pipit of the Panjáb, previously referred to A. SIMILIS, Jerdon, with the present species: and we feel little doubt that A. SIMILIS of the Indian peninsula will prove to be identical with ANTHUS CINNAMOMEUS of Rüppell. The S. Indian bird is very remarkable, among the MOTACILLIDÆ, for possessing an extremely rudimentary first primary.

* The Prince of Canino, enumerating the species of this genus, gives one as C. BAGUEIRA; by which we presume that the Indian bird is intended. *Comptes Rendus*, XXXVIII (1854), p. .

† Dr. Rüppell refers this bird to MEGALOPHONUS, G. R. Gray; but the characters are rather those of the true ALAUDÆ, except that the legs and feet are comparatively small and weak. The wing has the short first primary minute, the third, fourth, and fifth equal and longest, and the second and sixth are scarcely shorter. A. ERYTHROPYGGIA, Strickland, from Kordofan (*P. Z. S.* Nov. 1850), is probably affined to it.

The true MEGALOPHONI (v. *Brachonyx*, Swainson,) were classed as MIRAFRÆ by Dr. A. Smith; and they seem to be merely weak-billed MIRAFRÆ, and resemble MIRAFRA in wanting the tuft of short bristly feathers over each nostril, which is characteristic of the more typical Larks. CERTHILAUDA also wants this tuft, and MACRONYX (but the latter is a genus of *Pipits*, affined to the long-clawed CORYDALLÆ, as C. RICHARDI and C. RUFULA). Mr. G. R. Gray assigns to MEGALOPHONUS certain true Larks (possessing the nareal tuft) of S. Africa, which Dr. A. Smith classed as ALAUDÆ; but these constitute a peculiar form, CALENDULAUDA, nobis; ex. ALAUDA ALBESCENS, Lafr. (v. A. codea, A. Smith),—A. LAGEPA, A. Smith, &c.

The genus MIRAFRA, also, has hitherto been composed very heterogeneously. Confining it to the species devoid of nareal tufts, we therefore distinguish, 1, SPIZALUDA, nobis; ex. M. HAYI, Jerdon, which is a peculiar and rather thick-billed true Lark, as shewn by the form of the wing, &c.; and 2, ANNONAMES, Cabanis; ex. M. PHÆNICURA, Franklin,—AL. LUSITANIA, Gmelin (v. *deserti*, Licht., *isabellina*, Tem., et M. phænicuroides, nobis),—and probably M. CORDUFANICA, Strickland (*P. Z. S.* Nov. 26th, 1850), to which we suspect that A. cinnamomea, Bonap. (*Rev. Zool. &c.* 1851, p. 178), should be referred. (P. S. Since this note was first printed, we have learned of the prior establishment of the genus ANNONAMES; and that A. CINNAMONEA (CORDUFANICA?) is correctly referred to it; also the ALAUDA PALLIDA of Ehrenberg, which possibly

BUDYTES VIRIDIS (*Motacilla viridis*, Scopoli, founded on the bad figure in Brown's *Ill. Orn.* pl. 33, f. 2; *M. bistrigata*, Raffles; *B. melanocephala* et *B. beema*, Sykes; *B. neglecta*, *melanocephala*, et *flava*, apud Jerdon, *Catal.*; *M. melanocephala*, Lichtenstein; *B. flava* vel *neglecta* et *B. Rayi* vel *flaveola* of India and the Malay countries, *auctorum*). Two specimens, from Abyssinia.

*CRATEROPUS LEUCOPYGIUS, Rüppell. Abyssinia.

ERYTHROPYGIA GALACTOTES, (Tem.) Ditto.

*LANIUS COLLARIS, L. Ditto.

ENNEOCTONUS RUFUS, (Briss.). Ditto.

*LANIARIUS ERYTHROPTERUS, (Shaw). Ditto.

*DEIOSCOPUS CUBLA, (Latham). Ditto.

*PLATYSTEIRA SENEGALENSIS, (L.) M. and F. Ditto.

MERULA OLIVACEA, (L.) Ditto.

*THAMNOLEA SEMIRUFA (*Thamnobia*? *semirufa*, Rüppell.)—Ditto. Altogether distinct from *THAMNOBIA*, which we conceive to be nearly affined to *TROGLODYTES*.

*CERCOTRICHAS ERYTHROPTERUS, (L.) Ditto. This is a true *Sháma*; and the generic name *CERCOTRICHAS*, Boie, holds precedence of *Kittacincla*, Gould. Our museum now possesses three species,—*C. ERYTHROPTERUS* of Nubia, Abyssinia and Kordofan,—*C. MACROURUS* of India and the Malay countries,—and *C. LUZONIENSIS* (*Copsychus luzoniensis*, Kittlitz), of the Philippines.*

—rather than *LUSITANIA*—may be identical with our *Mirafra phænicuroides*, *passim*: but we have seen no description of *ANN. PALLIDUS*.)

There still remain 6 or 7 species of true *MIRAFRA*,—viz. 4 in India, *M. ASSAMICA*, *M. AFFINIS*, *M. ERYTHROPTERA*, and *M. CANTILLANS*,—a fifth in Java, *M. JAVANICA*,—a sixth in N. S. Wales, *M. HORSFIELDI*, Gould (which is affined to the Indian *M. CANTILLANS*), and Mr. Gould suspects another in N. Australia, larger and more nearly affined to *M. JAVANICA*. *M. ASSAMICA* is erroneously identified with the last-mentioned species by Mr. G. R. Gray.

N. B.—*M. flavigollis*, McClelland (*P. Z. S.* 1839, p. 163), is merely the female of *EMBERIZA AUREOLA*!

* There can be no doubt that *C. MACROURUS* (which is often termed the *Indian Nightingale*) is the species familiarly referred to as “the Nightingale” by Dr. J. D. Hooker, in his ‘Himalayan Journal’ (I, 332, II, 146): the season which he states them to be in song (October), quite sufficing to shew that the real Nightingale cannot be intended. The true British Nightingale abounds in Persia, where it is termed *Bulbul-i-hazár-dástán*, or the “bird with a hundred tongues;” and many caged Nightingales are brought from that country to Afghánistán in the first instance, and thence to India; a few finding their way even to Calcutta, where they command a high price as song-birds, and are known as the *Bulbul bosta*. To the proper *Fauna Indica*, the veritable genus *LUSCINIA* is unknown.

PRATINCOLA RUBICOLA, (L.) Abyssinia.

***PR. (?) SORDIDA**, (Rüppell). Two specimens. Ditto.

***SAXICOLA ISABELLINA**, Rüppell. Ditto.

S. AURITA, Temminck. Ditto.

***SYLVIA LEUCOPOGON**, Meyer. (*S. passerina*, Temminck; *S. subalpina*, C. L. Bonap.) Egypt.

***SALICARIA (?) CINNAMOMEA**, Rüppell. Abyssinia. This curious little bird is apparently congeneric with the **TRIBURA LUTEVENTRIS**, Hodgson, P. Z. S. 1845, p. 30, and *J. A. S.* XIV, 583; but as we have good specimens of neither for comparison, we can only thus indicate the affinity.

PHYLLOSCOPUS BONELLII, (Vieillot; *Sylvia Nattereri*, Temminck).

***TCHITREA MELANOGASTER**, (Swainson). Abyssinia. In plumage like some specimens of **TCH. AFFINIS**, nobis, but the bill and feet much smaller.

***HIRUNDO RIOCOURII**, Savigny (*H. cahirica*, Licht.; *H. rustica orientalis*, Schlegel). Specimen from Abyssinia, with under-parts not more rufous than in ordinary **H. RUSTICA**, from which it certainly (the present specimen at least) is insufficiently distinguished.

***H. MELANOCRISSS**, Rüppell. Abyssinia.

***H. (?) PRISTOPTERA**, Rüppell. A highly interesting and separable form of Swallow, with minute bill and feet, and the outer margin of its first primary having the extremities of the filaments reverted into hooks, as in the N. American **H. SERIPENNIS**, Audubon, which however is a COTILE (or burrowing bank Swallow).

***ORIOLUS MELOXITTA**, Rüppell. Abyssinia.

***NECTARINIA TAKAZE**, (Stanley). M. and F. Abyssinia.

N. FORMOSA, (L.) M. and F. Ditto.

***N. CRUENTATA**, Rüppell. Ditto.

***N. HABESSINICA**, Ehrenberg. Ditto.

***N. AFFINIS**, Rüppell. Ditto.

***N. METALLICA**, Lichtenstein. Nubia.

***ALSOCOMUS GUINEA**, (L.) Abyssinia.

ALS. ARQUATERIX, (Tem.) Ditto.

***TURTUR ERYTHROPHRYS**, Swainson. Two specimens are sent as **T. RISORIUS** apud Rüppell, one from Nubia, the other from Abyssinia. Both differ from the Indian Collared Turtle-dove (**T. RISORIUS verus**), and agree with that of S. Africa (**T. VINACEUS**), in having a much broader black semi-collar upon the nape. Both also are of a much paler hue than the S. African bird, especially on the crown. The Nubian is larger, the wing measuring 7 in. long, with its 1st primary $\frac{3}{8}$ in. shorter than the next, the 2nd and 3rd equal, and the 4th $\frac{1}{4}$ in. longer than the 1st; tail rounded, its outermost feathers $\frac{5}{8}$ in. shorter than the medial. Colour

nearly as in the Indian bird, but the vinaceous hue of the neck and breast more intense; the axillaries, sides, and under surface of the wing, dark ashy, whereas in the Indian bird they are whitish; the tail also is more broadly tipped with white, and its lower coverts are ashy. The feet too are larger and coarser; and bill pale-coloured. This is clearly Mr. Swainson's *T. ERYTHROPHRYS*; whereas the Abyssinian species is, as decidedly, the

**T. SEMITORQUATUS*, Swainson (though not well agreeing with Dr. Rüppell's figure of *SEMITORQUATUS*). Wing $6\frac{1}{4}$ in. only; its 1st and 3rd primaries $\frac{1}{2}$ in. shorter than the 2nd, and $\frac{3}{8}$ in. longer than the 4th: tail sub-even, its outermost feather being $\frac{1}{3}$ in. shorter than all the rest. Crown of the same vinaceous hue as the breast, scarcely infuscated, and devoid of ashy tinge; axillaries, sides, and under surface of wings, very pale ashy; and middle of belly and lower tail-coverts white. Bill black; and tarsi and toes conspicuously more slender and less coarse than in the preceding. From the very decidedly distinct form of the wings and tail, we do not hesitate to consider this as a distinct species from its various near congeners.*

* In the Cape species, *T. VINACEUS*, (Gm.), the 2nd and 3rd primaries are equal and longest, and the 1st and 4th are sub-equal, and $\frac{1}{4}$ in. shorter than the preceding: outer tail-feathers $\frac{5}{8}$ in. shorter than the medial. General colour much darker than in the others; the under-surface of wings dusky-ash; but the vent and lower tail-coverts are whitish.

T. RISORIUS of India has the third primary a little shorter than the 2nd, and the 1st $\frac{1}{2}$ in. shorter, and the 4th $\frac{3}{8}$ in. shorter, than the 2nd: tail-feathers sub-even, or slightly rounded, except the outermost pair, which are $\frac{1}{2}$ in. shorter than the medial. Nuchal semi-collar much narrower than in the others, and no vinaceous hue on the nape below it; beneath the wings are whitish; and the vent and lower tail-coverts are of a full ash-grey.

T. BITORQUATUS, (Tem.), of Java, Timor, &c., is another fine species of this immediate sub-group, with the grey of the crown and wings, and the vinaceous of the neck and breast, deeper and brighter than in the others; black semi-collar moderately broad, and margined (more broadly above) with white; beneath the wings very dark ashy; and vent and lower tail-coverts white.

The Indian *T. HUMILIS*, (Tem.), is somewhat less affined to the rest, and is very remarkable (among the *COLUMBIDÆ*) for the diverse hue of the sexes.

Having now five closely affined and very similar wild species or distinct races of Collared Turtle-dove actually before us, the question arises, to which of them should the common domestic Collared Turtle-dove (so abundantly bred in cages) be referred, if indeed to any one of them? This domestic breed would seem to be of exceedingly remote antiquity, and was probably derived by the

T. SENECALENSIS, (L. : *Col. cambaiensis*, Gmelin ; *C. aegyptiaca* ? Lath. ; *C. maculicollis* ? Wagler). Two specimens from Abyssinia differ from all the Indian we have seen, in having the colours distinctly broken on the scapularies, and more or less on the back ; the scapularies being of a dull

Hebrews from the Egyptians. The breadth of its black semi-collar points to an African rather than to an Indian origin. There can be little doubt that it is the "Turtle-dove" of our English version of the Pentateuch, repeatedly mentioned as the equivalent of a "young Pigeon" for a burnt-offering,—"a pair of Turtle-doves or two young Pigeons,"—and that it was abundantly propagated in cages as at present, and, therefore, always available. That our Indian **T. RISORIUS** is *not* (as currently supposed) the wild type of this domestic breed is indicated, firstly, by its very different voice or *coo*,—secondly, by its larger size, reversing the usual rule with domestic animals, and with the generality of tame Pigeons in particular, —and thirdly (as remarked before), the domestic Collared Turtle-dove has always a much broader black semi-collar than **T. RISORIUS**, in which it accords with the three wild races found in Africa. Of the latter, the Cape species (**T. VINACEUS**), and equally the Malayan (**T. BITORQUATUS**), may at once be set aside, for geographical reasons alone, besides that there are other objections : and of the two that remain, **T. SEMITORQUATUS** agrees best in size, and also in having white lower tail-coverts ; but the tail is more squared, and the feathers composing it are considerably broader, while the black bill seems to be a further objection. Comparison of voice would of course assist the enquiry. To the best of our judgment, not one of the five accords sufficiently ; and the genuine wild type may yet remain to be discovered, in another equally affined wild species, of which there may be several yet undescribed. The tame breed is very true to its particular colouring, except when pure white, and the white are often matched with the ordinary blonde or cream-coloured Doves, producing an intermediate or pallid offspring : but the cream-colour has a decided look of domesticity, and is unlikely to have been the original hue. Mr. Selby assures us that "a mixed breed is often obtained between it and the common wild Turtle-dove" of Britain (**T. AURITUS**) ; "but the progeny are invariably mules and incapable of further increase,—a fact that has been established by many careful and oft-repeated experiments." Jardine's *Nat. Libr., Columbidæ*, p. 172. The same experiments might easily be tried with the Indian **T. RISORIUS** ; only in this instance the affinity is undoubtedly closer.

(P. S.—Since the above was in type, we have seen the Prince of Canino's *Coup d'Œil sur les Pigeons*, published in the 'Comptes Rendus' for 1854-5, and especially his remarks on the Turtle-doves (1845, pp. 15, 16). The particular subgroup of **T. RISORIUS** and its affines is designated by his Highness **STREPTOPELIA** ; and he refers to it four species from Africa, and five from Asia and its dependencies. The domesticated race is assigned (as currently) to **T. RISORIUS**. To judge from Dr. Rüppell's figure, however, we should have referred the Abyssinian **T. LUGENS** to

fuscous-brown, with broad ferruginous tips, whereas in the Indian bird the two colours are completely blended, or there is (at most) but a faint indication of the *break*, which must be sought for to be observed. Savigny's coloured figure of the Egyptian bird must either represent a distinct species, or both size and colouring are exceedingly exaggerated.*

**CENA CAPENSIS*, (Latham). Abyssinia.

PTEROCLES EXUSTUS, (Tem.): female, from Nubia.

**Pt. SENEGALENSIS*, Lath. (*Pt. guttatus*, Licht.) Mas. Ditto.

**CLAMATOR* (?) *ERKELII*, (Rüppell). Abyssinia.

**GLAREOLA LIMBATA*, Rüppell. Two specimens. Ditto.

**LOBIVANELLUS MELANOCEPHALUS*, Rüppell. Ditto.

**L. SENECAELENIS*, (L.; *Vanellus lateralis*, A. Smith). Ditto.

SARCIOPHORUS CORONATUS, (L.) Nubia.

* " *PILEATUS*, (L.) Ditto.

* " *MELANOPTERUS*, (Rüppell). Abyssinia.

**METOPIDIUS AFRICANUS*, (L.) Abyssinia.

PHILOMACHUS PUGNAX, (L.) Ditto.

SYPHEOTIDES (?) *VIGORSII*, A. Smith (*O. scolopacea*, Tem.; *O. ruficrista*, A. Smith, *apud nos.*, Catal.) S. Africa.

**S. MELANOGASTER*, (Rüppell). Female. Abyssinia. Closely affined to the Bengal Floriken (*S. BENGALENSIS*); but shorter in the tarse, with some other distinctions.

S. AFER, (Latham). Two specimens. S. Africa.

**SCOPUS UMBRETTA*, (L.) Abyssinia.†

the group of *Turtures auriti*; and, of this latter group, may remark that *T. RUPICOLA*, (Pallas,) replaces *T. MEENA* in the Simla and Masuri hills. *T. DUSSUMIERI*, (Tem.), "with broad collar, from Malasia and the Philippines," we have never seen from continental Malasia (*i. e.* the Malayan peninsula); where *T. TIGRINUS* abounds, distinct alike from *T. SURATENSIS* and *T. CHINENSIS*. *STR. GAIMARDI*, C. L. Bonap., "with much narrower collar, and much shorter toes," than *STR. DUSSUMIERI*, is described from the Marianne Islands; and the fifth Asiatic species of *STREPTOPELIA* is the Indian *HUMILIS*, so remarkable for the diversity of the sexes.)

* The Prince of Canino separates the Indian and N. African races.

† Mr. Frith remarks the affinity of this curious genus for *ANASTOMUS*; *vide* especially the young of the latter. We suspect, from the figures we have seen of that extraordinary and gigantic wader from the White Nile, lately described by Mr. Gould as *BALÆNICEPS REX*, that this latter bears much the same relationship to *SCOPUS*, that *CANCROMA* does to *ARDEA* and especially *NYCTICORAX*. *BALÆ-*

**CICCONIA ABDIMII*, Licht. (genus *Sphenorhynchus*, Hemprich; *Abdimia*, and the species—*Abd. sphenorhyncha*, C. L. Bonap.) Ditto.

ARDEA PURPUREA, (L.) Two specimens. Ditto.

HERODIAS ASHA, (Sykes; *A. gularis*, Bosc.; *H. pannosa*? Gould). From the Red Sea. We have long suspected the identity of these; and so far as the present specimen enables an opinion to be formed on the subject, our suspicions are confirmed: but it is still desirable to compare adults in breeding livery. (The Prince of Canino admits all three as distinct. *Comptes Rendus*, 1855, p. 720.)

H. BUBULCUS, (Savigny). Sent as *H. Veranii*, (Roux), from Egypt. This is the third specimen which we have received as *H. Veranii*, the others being respectively from Sicily and Algeria. We cannot perceive in them the slightest difference in size, proportions, or colouring, from the common Buff-backed Egret of India and Java; and, therefore, can only regard them as of one species.

NYCTICORAX GRISEUS, (L.) Adult and young (the latter remarkable for the strong rufous tinge on its great alars and caudals); from Abyssinia.

**FULICA CRISTATA*, L. Two specimens. Ditto.

GALLINULA CHLOROPUS, (L.) Ditto.

THALASSEUS BENGALENSIS, (Lesson): *Sterna media* (?), Horsfield; *St. affinis*, Rüppell; *St. Torresii*, Gould; *Sterna*, Jerdon's *Catal.* No. 402). A species widely diffused over the Indian Ocean, from the shores of India and Africa to those of Papua and Australia. Specimen from the Red Sea; exactly resembling another from the Bay of Bengal: while a third, from Singapore, in winter dress (like that originally described by M. Lesson), exhibits the greater development of black upon the primaries noticed by Dr. Pucheran in *Rev. Zool. &c.* 1850, p. 544.*

STERNA HIRUNDO, L. From the Red Sea. Identical with specimens from Europe and S. India.

**PLECTROPTERUS GAMBENSIS*, (Latham). Abyssinia.

**DENDROCYGNA VIDUATA* apud Rüppell. Young, from Abyssinia. This can hardly be the same species as *D. viduata*, (L., *vera*), from S. Amer-

NICEPS, *SCOPUS*, and *ANASTOMUS* are all African forms, the last having also a peculiar Indian species. (The African species heretofore referred to *ANASTOMUS*—*A. LAMINIGERUS*, Tem.—is the type of *HIATOR*, Reichenbach.)

* There can be little doubt also of the identity of *St. velox*, Rüppell, with *TH. CRISTATUS*, (Stephens, nec Swainson, v. *St. pelicanoides*, King); from the Indian Ocean, China, and N. Australia. We have a specimen from the Maldives, and another from the Tenasserim coast.

rica; figured in Griffith's Translation of and Commentary on Cuvier's *Régne Animal*, VIII, 671.

ANAS ERYTHRORHYNCHA, (L.) Two specimens. Ditto.

**A. LEUCOSTIGMA*, Rüppell. Ditto.

**A. RUPPELLI*, nobis, n. s. Sent as *A. PŒCILORHYNCHA*, from Central Africa. A smaller bird than *A. PŒCILORHYNCHA (vera)*, which was originally described from Ceylon), with closed wing measuring 9½ in.: beak to forehead 1⅔ in.; and tarse 1⅓ in. Colour nearly as in the common Indian bird, but with the head and neck uniformly streaked; whereas *A. PŒCILORHYNCHA* has the crown and stripe through the eyes dusky, and superciliun and rest of head and neck whitish, with minute dusky specks: wing-speculum much the same; but *A. PŒCILORHYNCHA* has the entire outer web of the larger tertaries white, while *A. RUPPELLI* has only their extreme outer border white. The rump and upper and lower tail-coverts in *A. PŒCILORHYNCHA* are uniformly dark-coloured, and brightly glossed with green in the male; in *A. RUPPELLI* they are variegated like the back and belly. Lastly, the bill of the latter is more than proportionally smaller, much less gibbous at base, and differently coloured. In *A. PŒCILORHYNCHA* the gibbous triangle on either side of the advanced frontal feathers is of a bright orange-colour; the tip of the bill, with the posterior half of the *dertrum*, intense yellow;* and the rest black: in *A. RUPPELLI* the bill is chiefly yellow, with merely a portion of its upper surface and the *dertrum* black. The legs also appear to be infuscated, instead of bright coral-red as in the other.

PHALACROCORAX AFRICANUS, (Gm.) Adult, from Abyssinia. M. Malherbe previously favoured us with an example of the young of this species, from Algeria.†

Of reptiles, one species only is sent, *PSAMMOSAURUS SCINCUS*, (Merrem), *v. griseus*, (Daudin), from Nubia: and

Of fishes, only *CHROMIS BOLTI*, Cuv., from the Nile.

* Erroneously coloured red in Hardwicke's figure.

† The following presumed identifications may be here suggested.

DRYMOICA INORNATA, (Sykes, 1832), with *DR. MYSTACEA*, Rüppell (1835).

DR. GRACILIS, Rüppell (1835), with *DR. LEPIDA*, nobis (1844).

MELANOCORYPHA BIMACULATA, Menetries, with *M. TORQUATA*, nobis, *J. A. S. XVI*, 476. (The latter is not a true *MELANOCORYPHA*, but the type of *CALANDRINA*, nobis.)

PELICANUS CRISPUS, Bruch, with *P. PHILIPPENSIS* (*v. roseus et manillensis*), Gmelin: nec *P. JAVANICUS*, Horsfield, which in India is equally common; while *P. ONOCROTALUS* (*verus*) is rare.

2. Capt. S. R. Tickell, Maulmein. A collection of bird-skins, from the mountainous interior of the Tenasserim provinces. This collection contains several new species; and among them is the female of apparently an undescribed Hornbill.

BUCEROS TICKELLI, nobis, n. s. Length 25 or 26 in.; of wing 12 in.; and tail 11 in. Bill $4\frac{1}{2}$ in. from forehead, and 2 in. in greatest vertical depth, at $\frac{1}{4}$ of its length from base; the basal half of the upper mandible gibbous, or pinched up (as it were) into a sharp keel, which descends more abruptly upon the forehead (where concealed by the erect frontal feathers), and slopes evenly forwards till it disappears, at about $\frac{2}{3}$ of the length of the bill from base. Occipital crest ample; the feathers open-webbed, and with those of the crown fuscous-brown with narrow pale mesial line to each: upper-parts uniform dark fuscous-brown, with a slight gloss of green; the middle pair of tail-feathers coloured like the back, but the rest much darker, or glossy green-black,—as are likewise the primaries and secondaries, which are more or less margined with brown (nearly as in *B. GALERITUS*): some pale feathers at base of the winglet; and the 3rd to the 7th primaries (inclusive) have their outer web emarginated successively further from the base, the commencement of the emarginated portion of each being somewhat broadly edged with fulvous-white: primaries and rectrices tipped with dull white, more or less speckled with dusky: the entire under-parts dull rusty-isabelline, except the feathers at the base of the lower mandible, which are coloured like those of the crown: in texture the feathers of the lower-parts are loose and open-webbed, especially on the throat and front of neck. Bill intermixed dusky and yellowish-white, passing to yellow on the imperfectly developed casque.

This conspicuously distinct species from any other Hornbill which we have seen, was found by Capt. Tickell "confined to the great hills (the continuation of the Himalaya and Yo-ma-tsung) which run N. and S. through the Tenasserim provinces, and form the back-bone of the Malayan peninsula. They are wild and wary, and keep to the summits of such colossal trees that it is no wonder Mr. Barbe and other collectors in this country never procured a specimen. I believe, however, that no European has ever been into those jungles besides myself. This Hornbill and *B. PUSARAN* have a steady even flight. All the others I have seen, viz. *CAVATUS*, *ALBIROSTRIS*, *NIPALENSIS*, *PICA*, and *BIROSTRIS*, proceed with those singular flappings and sailings, so peculiar to this genus: and it is strange that these two species should offer so marked a distinction."*

* Capt. Tickell has subsequently forwarded a more elaborate description of this Hornbill, for publication in the Society's Journal.

PARUS SUBVIRIDIS, Tickell, n. s. Affined to *P. XANTHOGENIS* and *P. SPILONOTUS*; but the whole of the under-parts dull yellowish-green without a trace of black, passing to ashy on the vent and lower tail-coverts: back much the same, but darker, with the feathers centred yellower, imparting a mottled appearance: crown and nape black, a few of the posterior long crest-feathers tipped with yellow: feathers at base of bill, the lores, cheeks and sides of neck, supercilia, and mesial nape-streak, bright yellow: wings and tail dull black, the great alars and caudals margined with ashy, and two or three of the primaries with whitish; a conspicuous white patch also at the base of the primaries; and the tertaries are tipped on the outer web with an elongate whitish spot, this hue also extending up the inner web of the smallest tertiary: the smallest wing-coverts are tipped with ashy, and the first great range of wing-coverts with white upon both webs, the second range upon the outer web only; forming two cross-bands on the wing: the anterior half of the wing is white underneath, but the axillaries are light yellow: the outermost tail-feather has its exterior web dull white, and a spot of the same tipping the inner web; this spot being successively smaller on the penultimate and ante-penultimate tail-feathers: bill black; and legs plumbeous. Length about $4\frac{3}{4}$ in.; of wing $2\frac{3}{4}$ in.; and tail 2 in.: longest crest-feathers $\frac{5}{8}$ in.

"Shot at an elevation of 3,500 ft. The PARI are very uncommon in the Tenasserim forests. In fact," remarks Capt. Tickell, "this is the only one I have seen."

PTERUTHIUS EERALATUS, Tickell, n. s. Quite similar to *PT. ERYTHROPTERUS* of the Himalaya, excepting that the latter has constantly the tertaries wholly ferruginous in both sexes. In the Tenasserim bird, the female has the tertaries greenish golden-yellow, like the secondaries, with merely a tinge of ferruginous upon the shaft and on the inner web only of each; and the male differs from that of the Himalayan bird by having nearly the whole outer webs of the tertaries bright golden-yellow, the smallest having also a black tip and inner edge, the next a black tip to the outer web only, the third and longest an oblique and elongated black tip to the outer web only, and the feather succeeding this (or last of the secondaries) has also a mark $\frac{7}{8}$ in. long on its outer web of mingled ferruginous and golden-yellow. We also cannot perceive, in the male sent by Capt. Tickell, any trace of the carneous tinge, seen particularly on the flanks posteriorly of *PT. ERYTHROPTERUS*; and the female has the under-parts, with the exception of the white throat only, much more fulvescent than the under-parts of the female *PT. ERYTHROPTERUS*. The two species or races indeed manifest much the same relation-

ship to each other, as do *SERILOPHUS LUNATUS* (Gould), of Burma, and *S. RUBROPYGIUS*, (Hodgson), of the S. E. Himalaya. The Tenasserim *PTERUTHIUS* was "found at an elevation of 3,500 to 4,500 ft."

GARRULAX STREPITANS, Tickell, *n. s.* One of the *G. BELANGERI* and *G. LEUCOLOPHOS* series. Crown and occiput rich tawny-brown; the nareal plumes, lores, cheeks and chin, blackish, passing into dull tawny-brown on the throat and front of the neck, and to a more ferruginous brown on the ear-coverts posteriorly: a large patch of white on the sides of the neck, pure and strongly contrasting with the dark crown and ear-coverts, but shading off gradually to ashy on the middle of the nape, the back, and sides of the breast: the ashy of the back shades off to greenish olive-brown on the rump, wings, and flanks, also on the vent, lower tail-coverts, and tibial plumes; passing on to blackish on the tail: breast and middle of the belly ashy, the pectoral feathers tawny-brown anteriorly. Bill and feet black. Length about 11 in.; of wing $4\frac{1}{4}$ in.; and tail 5 in., its outermost feather 1 in. shorter: bill to forehead $1\frac{1}{8}$ in.; and tarse $1\frac{1}{2}$ in.

"Common from 3,000 to 5,000 ft., and pre-eminently noisy."

. *G. MELANOSTIGMA*, nobis, *n. s.* Affined to *G. ERYTHROCEPHALUS* and *G. RUFICAPILLUS*. Entire crown very bright rufo-ferruginous, contracting along the occiput: small frontal plumes, lores, and chin, black: sinicipsa and cheeks ashy, with black mesial streaks, more developed on the ear-coverts: general hue greenish olive-brown, having a tawny tinge on the nape, sides of neck, breast and middle of the belly, the breast being paler: throat and front of the neck rufo-ferruginous, shading into the duller hue of the breast: wings and tail bright greenish golden-yellow; the coverts of the primaries deep black, forming a conspicuous patch, and the next range of coverts bright ferruginous inclining to cinnamon-colour: secondaries and tertaries conspicuously tipped with blackish. Bill black; and legs brown. Length about $10\frac{1}{2}$ in.; of wing $4\frac{1}{8}$ in.; and tail $4\frac{1}{2}$ in., its outermost feathers $1\frac{1}{4}$ in. shorter: bill to forehead 1 in. or nearly so; and tarse $1\frac{1}{2}$ in.

"Common, and found with the last; but ranging higher still, up to the vast wall-like crags of Moolé-it; 7,500 ft. Sexes alike."*

* The extraordinary development of this genus demands a new Conspectus of the species, for which the Society's museum affords better materials than perhaps any other. We have vainly tried to arrange them satisfactorily into minor groups; and cannot follow Mr. G. R. Gray in adopting the three headings of *GARRULAX*, *TROCHALOPTERON*, and *PTEROCCYCLOS* (the last pre-occupied in Malacology). The species not in the Society's museum are here distinguished by an asterisk.

TURDINUS CRISPIFRONS, nobis, n. s. Very like T. MACRODACTYLUS (*Malacopteron macrodactylum*, Strickland, v. *Brachypteryx albogularis*,

1. G. BELANGERI, Lesson, *Zoologie du Voyage de M. Belanger*, p. 258, with coloured figure: *Ianthocincla leucolophos?* var., *apud nos*, *J. A. S.* X, 924. Common in Pegu and the Tenasserim provinces.

2. G. LEUCOLOPHOS; *Corvus leucolophos*, Hardwicke (Gould's 'Century,' pl. 18). Himalaya; Asám; Khásya hills; Arakan.

*3. G. PERSPICILLATUS; *Turdus perspicillatus*, Gmelin; Shaw's 'Zoology,' X, 325; *le Merle de la Chine*, Buffon. China.

*4. G. BICOLOR, Müller; *Rev. Zool. &c.*, 1844, p. 402. Nearly affined to the three preceding species. From the west of Sumatra.

*5. G. MITRATUS, Müller. Of this we have seen no description.

6. G. STREPITANS, Tickell, *ut supra*.

*7. G. CINEREIFRONS, Kelaart, nobis, *J. A. S.* XX, 176. Mountains of Ceylon.

*8. G. DELESSERTI; *Crateropus Delesserti*, Jerdon, *Madr. Journ.* X, 256 (*Ill. Ind. Orn.*, pl. 13): *Cr. griseiceps*, Delessert. Nilgiris.

9. G. CHINENSIS; *Lanius chinensis*, Scopoli: *Corvus auritus*, Gmelin: *Turdus shanho et T. melanopis*, Gmelin; *Crateropus leucogenys*, nobis, *J. A. S.* XI, 180. China; and also Tenasserim provinces (Ye): *vide J. A. S.* XXIII, 732. Remarkable for the rigidity of its frontal plumes.

10. G. CÆRULATUS; *Cinclosoma cærulatum*, Hodgson, *As. Res.* XIX, 147. S. E. Himalaya.

11. G. RUFICOLLIS; *Ianthocincla ruficollis*, Jardine and Selby (*Ill. Orn.* 2nd series, pl. 21): *I. lunaris*, McClelland and Horsfield. S. E. Himalaya; Asám; Sylhet; Tippera.

*12. G. RUFIFRONS; *Crateropus rufifrons*, Swainson, 2 $\frac{1}{2}$ Centen. p. 290: *G. rubrifrons*, Lesson. Java.

13. G. ALBOGULARIS; *Ianthocincla albogularis*, Gould, *P. Z. S.* 1831, p. 187: *Cinclosoma albogula*, Hodgson, *As. Res.* XIX, 146. Himalaya; Khásya hills.

*14. G. GULARIS; *Ianthocincla gularis*, McClelland and Horsfield, *P. Z. S.* 1839, p. 159. Asám.

*15. G. McCLELLANDII, nobis, *J. A. S.* XII, 949: *Ianthocincla pectoralis* apud McClelland and Horsfield, *P. Z. S.* 1839, p. 160. Asám. (Qu. G. MONILIGER, No. 17?)

16. G. PECTORALIS; *Ianthocincla pectoralis*, Gould, *P. Z. S.* 1835, p. 186: *Cinclosoma grisaure*, Hodgson, *As. Res.* XIX, 146: *G. melanotis*, nobis, *J. A. S.* XII, 149 (var.) Himalaya; Arakan; Tenasserim provinces.

17. G. MONILIGER; *Cinclosoma moniliger*, Hodgson, *As. Res.* XIX, 147. S. E. Himalaya; Asám; Tippera; Arakan; Tenasserim provinces.

18. G. MERULINUS, nobis, *J. A. S.* XX, 521. Khásya hills.

Hartlaub), of the Malayan peninsula (described *J. A. S.* XIII, 382); but smaller and non-rufous, with longer, softer, and more graduated tail, and

19. G. OCELLATUS; *Cinclosoma ocellatum*, Vigors, *P. Z. S.* 1831, p. 55. (Gould's *Century*, pl. 15). Himalaya.
 20. G. RUFOGULARIS; *Ianthocincla rufogularis*, Gould, *P. Z. S.* 1835, p. 48: *Cinclosoma rufimenta*, Hodgson, *As. Res.* XIX, 148. Himalaya; Khásya hills; Tippera.
 21. G. SQUAMATUS; *Ianthocincla squamata*, Gould, *P. Z. S.* 1835, p. 47: *Cinclosoma melanura*, Hodgson, *As. Res.* XIX, 147. (Jardine and Selby, *Ill. Orn.*, 2nd series, pl. 4). S. E. Himalaya; Khásya hills.
 22. G. SUBUNICOLOR, Hodgson, *J. A. S.* XII, 952, XIV, 599. S. E. Himalaya.
 23. G. AFFINIS, Hodgson, *J. A. S.* XII, 950. Nepal.
 24. G. VARIEGATUS; *Cinclosoma variegatum*, Vigors, *P. Z. S.* 1831, p. 55: *G. Abeillei*, Lesson. (Gould's 'Century,' pl. 16). N. E. Himalaya.
 25. G. CHRYSOPTERUS; *Ianthocincla chrysoptera*, Gould, *P. Z. S.* 1835, p. 48. S. E. Himalaya.
 26. G. ERYTHROCEPHALUS; *Cinclosoma erythrocephalum*, Vigors, *P. Z. S.* 1831, p. 171. (Gould's 'Century,' pl. XVII.) N. W. Himalaya; Nepal (*nec* Sikim).
 27. G. RUFICAPILLUS, nobis, *J. A. S.* XX, 521. Khásya hills.
 28. G. MELANOSTIGMA, nobis, *ut supra*. Tenasserim provinces.
 29. G. PHÆNICEUS; *Ianthocincla phœnicea*, Gould (*Icones Avium*): *Crateropus puniceus*, nobis, *J. A. S.* XI, 180. S. E. Himalaya; Khásya hills.
 30. G. (?) CACHINNANS; *Crateropus cachinnans*, Jerdon, *Madr. Journ.* X, 255 (et pl. 7): *Cr. Lafresnayei*, Ad. Delessert; *Cr. Delesserti*, La Fresnaye (*nec* DELESSERTI), Jerdon). Nilgiris.
 31. G. (?) JERDONI, nobis, *J. A. S.* XX, 522. Nilgiris.
 32. G. (?) LINEATUS; *Cinclosoma lineatum*, Vigors, *P. Z. S.* 1831, p. 55: *Cinclosoma setiferum*, Hodgson, *As. Res.* XIX, 148; *C. striatum* (?), Royle's list. Himalaya generally; Alpine Punjab.
 33. G. (?) IMBRICATUS, nobis, *J. A. S.* XII, 951. Butan.
 - N. B.—G. *Feliciae*, Lesson, = *LEIOOTHRIX STRIGULA* (Hodgson), v. *Muscicapa variegata*, Ad. Delessert, and *Leiothrix chrysocephala*, Jameson.
- The last two species approximate the division ACTINODURA, Gould; to which are referred—
1. A. EGERTONI, Gould, *P. Z. S.* 1836, p. 18: *Leiocincla plumosa*, nobis, *J. A. S.* XII, 950. (Figured in Gould's 'Birds of Asia.') S. E. Himalaya; Asám: Khásya hills. And
 2. A. NIPALENSIS; *Cinclosoma nipalense*, Hodgson, *As. Res.* XIX, 145. (Also figured in Gould's 'Birds of Asia.') S. E. Himalaya. Then follows—

erect, short and stiff frontal plumes, which are much less developed in the other species: the rictal bristles are also much slighter. Length

**LEIOPTILA ANNECTANS*, nobis, *J. A. S.* XVI, 450. Sikim. And, lastly, the genus *SIBIA*, Hodgson, comprising—

1. *S. PICOIDES*, Hodgson, *J. A. S.* VIII, 38: *Heterophasia cuculopsis*, nobis, *J. A. S.* XI, 187. S. E. Himalaya.

2. *S. GRACILIS*; *Hypsipetes gracilis*, McClelland and Horsfield, *P. Z. S.* 1839, p. 159; *J. A. S.* XVI, 149, XX, 521. Asám; Khásya hills.

3. *S. CAPISTRATA*; *Cinclosoma capistratum*, Vigors, *P. Z. S.* 1831, p. 85: *C. melanocephalum* (?), Royle's list: *S. nigriiceps*, Hodgson, *J. A. S.* VIII, 38. Himalaya generally.

It is very remarkable that no species of this group has hitherto been noticed from the Malayan peninsula; and two or three only, as yet, in the great islands: but Capt. Tickell's recent discovery of two new species in the mountainous interior of the Tenasserim provinces renders it likely that others will yet be met with further south, when the loftier regions of the interior come to be explored. A recent author observes, that "although Malacca birds are among the very commonest in European collections, I am not aware that the country has been visited by any ornithologist." * * * There are two Portuguese resident in Malacca, whose sole business is procuring and selling the skins of mammalia and birds. They have numbers of the Malays of the interior in their employ, whom they furnish with ammunition, arseniated soap, &c. All the birds are skinned and put up by these Malays, who are paid a small sum per skin. The greater part of the birds thus come from one or two localities only, where, as this collecting has been going on for years, there can hardly be a new bird to be found." *Ann. Mag. N. H.*, Feb. 1855. Yet this author (Mr. A. R. Wallace) mentions certain species as having been procured by himself, during his nine weeks stay at Malacca, which we have never seen in collections from that neighbourhood, that had been purchased of the dealers referred to; and other species as being there common, which we have rarely seen in such collections (*NECTARINIA HYPOGRAMMICA* for example). It is very evident that the more dull-coloured species, and also those which are particularly abundant about the station (unless of remarkably shewy plumage), are neglected. *ALCEDO BERYLLINA*, Vieillot (*v. A. biru*, Horsfield), is stated to occur there, and Helefer mentions it as an inhabitant of the Tenasserim provinces; but we have seen it from neither portion of that range of country, though likely enough to occur; and, of restricted *ALCEDO*, only *A. EURYZONA*, Tem., *A. MENINGTING*, Horsf., and *A. BENGALENSIS*, Gmelin (the common Indian bird). Mr. Wallace's *HALCYON GULARIS* is probably the Indian *H. SMYRNENSIS*, which abounds in the Malayan peninsula, and accords precisely with the late Mr. Strickland's description of a Smyrna specimen! A Woodpecker is mentioned as "like *HEMICERCUS CONCRETUS*, but with head and crest of the same colour as the body."

about $7\frac{1}{2}$ in.; of wing 3 to $3\frac{1}{4}$ in.; and tail 3 to $3\frac{1}{4}$ in.; its outermost feather $\frac{4}{5}$ in. shorter: bill to gape 1 in.; and tarse the same. Colour deep non-rufous olive-brown, the feathers of the head, neck, and back, pale-shafted, and margined with black; a pure white speck at the tip of the smallest tertiary, and sometimes to that of the next, and probably of more: throat pure white, marked with dark olive, but differently from that of *T. MACRODACTYLUS*; in the latter species the feathers surrounding the throat are more or less broadly black-tipped; but in *T. CRISPIFRONS* they are black medially, with white outer edge and extreme tip, and the dark markings are less abruptly defined and do not surround and circumscribe the throat as in the other species: lower-parts tinged with ashy, mingled with whitish along the middle. Bill dusky, pale underneath and at tip; and legs dark olive-brown. "Not uncommon, but very local, and confined entirely to deep thickets amongst rocks."

T. BREVICAUDATUS, nobis, n. s. A third and more aberrant species, remarkable for its short tail, in which respect the Malayan *T. MACRODACTYLUS*, (Strickland), is intermediate to this and the preceding species. Size comparatively small. Length about $5\frac{1}{2}$ in., of which tail $1\frac{5}{8}$ in.; its outermost feather $\frac{3}{5}$ in. shorter than the medial: closed wing $2\frac{1}{2}$ in.; more rounded than in the two other species, having the sixth to the tenth primaries sub-equal and longest: bill to gape $\frac{4}{5}$ in.: tarse $\frac{7}{8}$ in. Colour of the upper-parts much as in the preceding species, but somewhat more rufescent, and the feathers still softer and less elongated; of a rich olive-brown, black-bordered, and paler towards shaft; at forehead inclining to ashy, and scarcely stiffened: plumage over the rump discomposed, and excessively dense and copious: throat mingled dusky and whitish; and rest of the lower-parts weak ferruginous, deepest on middle of belly, vent

Can this be the adult female of *H. CONCRETUS*, which has the head and crest plain ashy? Whereas the young female has these parts fulvous, and the young male has the crown fulvous and the lengthened occipital crest dull crimson; the adult male having a crimson crown and ashy crest! The beautiful *MACROPTERYX COMATUS* is a novelty, as inhabiting the Malayan peninsula: also *PERICOCOTUS MINIATUS*, Tem. (if rightly identified,—we have seen the Indian *PER. SPECIOSUS* from Pinang!); "*IXOS ANALIS*, Horsf." is probably *PYCNONOTUS CROCORRHOUS*, Strickland. Mr. Wallace's *MUSCIPETA PARADISEA* is doubtless our *TCHITREA AFFINIS*, which it quite distinct from *TCH. PARADISI* (*vera*) of India: and his *PHYLLORNIS ICTEROCEPHALUS*, Tem., is doubtless *PH. COCHINCHINENSIS*, Lath., *apud nos*.—*Buceros nigrirostris*, nobis, proves (from this gentleman's observation) to be the female of *B. MALAYANUS*, Raffles (*v. anthracinus*, Tem.); of which Dr. S. Muller considered it to be a permanent variety.

and lower tail-coverts: a series of whitish terminal specks on the great range of wing-coverts, and others tipping the secondaries and tertaries. Bill dusky above, pale below; and legs pale, with whitish claws.

These birds belong to a group which is pre-eminently difficult of classification, *viz.* the great *TIMALIA* series, which attains its maximum of development in the Malayan peninsula. As a genus or sub-genus, it is barely separable from *TRICHASTOMA*, *nobis*, and this again from *MALACOPTERON*, *ALCIPPE*, *nobis* (exemplified by *BRACHYPTERYX SEPIARIA*, Horsfield, and numerous other species affined to it). *TURDINUS* is distinguished by its robust form and especially by its peculiarly mottled plumage, the feathers being mostly pale-shafted and black-edged. It is not distantly affined to *PELLORNIUM*.*

POMATORHINUS HYPOLEUCOS, *nobis*, *var.?* (*J. A. S.* XIII, 371; XIV, 599). Specimen remarkable for having narrow white mesial streaks to the feathers of the nape, chiefly towards the sides of the nape, which we can perceive no trace of in Arakan specimens; and similar well defined but wider streaks on the dark ash-coloured sides of the breast, which are little more than indicated in the Arakan specimens under examination. Bill to gape 2 in. Perhaps a distinct variety, more probably merely a particularly fine adult, of *P. HYPOLEUCOS*.†

* In a preceding note, we cited a paper on Malacca birds, by Mr. A. R. Wallace. The species which he remarked to be most abundant, were the different Bulbuls, "and the various strong-legged birds forming the genera *TIMALIA*, *MACRONOTUS*, &c. These latter birds are found to be abundant both in species and individuals, when carefully searched for on the sides of roads and other places where there is a thick low jungle; while the former are found on every fruit-tree and about the Malay villages. Their affinities are most interesting and puzzling. I have eight species of birds," he adds, "all of an obscure dusky-olive plumage and nearly of the same size, which can only be distinguished by minute differences in the bill, or obscure markings in various parts of the plumage. They appear to belong to the genus *TRICHASTOMA*, Blyth; and are mostly fruit-eating birds, though they also feed freely on insects." Yet, although so common, we can rarely glean a specimen from the Malacca collections got up by the Portuguese dealers, which consist of the same ever recurring gaudy-coloured skins, *usque ad nauseam*. It may be inferred that a large proportion of the *TIMALIA* and *MALACOPTERON* series yet remain to be described.

† With reference to this species, Capt. Tickell writes—"I must beg to demur about its being classed in *POMATORHINUS*. Examine narrowly the bill, which will be found softer in texture (this, however, in a dry skin cannot be well perceived), and sub-cylindrical; whereas *POMATORHINUS* has the bill exceedingly

P. ALBOGULARIS, nobis, n. s. Though most closely affined to *P. PHAYREI*, nobis (*J. A. S.* XVI, 452), of the Arakan and Khásya hills, we consider this to be evidently a distinct race. It is a larger bird than *P. PHAYREI*, with the upper-parts of a finer and richer tawny hue, especially on the crown, and the lower-parts of a much fainter rufous; the white upon the throat is more extended, and passes gradually into the rufescent hue of the breast; the feathers at the base of the lower mandible are pure white, whereas in *P. PHAYREI* the upper half of them are black; there is also much more white on the upper-part of the loral region, and the supercilia are broader and purer white. Length of wing $3\frac{7}{8}$ in.; of middle tail-feathers $4\frac{1}{2}$ in.; and of bill to gape $1\frac{1}{4}$ in. Specimen male.

(Of three closely affined species of this genus, *P. RUBIGINOSUS*, nobis, of Sikim, is distinguished by its black crown, and the deep rufo-ferruginous colour of its breast and long pointed loral feathers; the hue of the upper-parts is also more rufescent than in the others: *P. PHAYREI*, nobis, of the Khásya and Arakan hills, has the crown of the same tawnyish olive-brown as the back, and the lower-parts are of a much weaker rufo-ferruginous than in *P. RUBIGINOSUS*; the loral feathers are short, and the white supercilium is narrower than in the others and of the same breadth throughout: *P. ALBOGULARIS* has the lower-parts merely tinged with rufo-ferruginous; but the upper-parts are of rather a bright tawny-brown, and a supercilium commences from a large triangular white loral patch, which is conspicuously bordered above with black. All have the cheeks and sides of the neck black; and the bill bright coral-red, which soon fades in the stuffed specimen, it being perhaps of a yellower coral-red in *P. PHAYREI*).

Both *P. HYPOLEUCOS* (var.?) and *P. ALBOGULARIS* were procured by Capt. Tickell at the base of Moolé-it, at an altitude of 5 to 6,000 ft.*

compressed and hard. Then the shape of the head with its flat sinciput, and the fan-like broad tail."—Should it be deemed advisable to detach *P. HYPOLEUCOS* from *POMATORHINUS*, a second and rather less typical species exists in *P. ERYTHROGENIS* of the Himalaya; and the Australian type, with very differently shaped wing, is still more distinct and separable.

* Of this genus, also, no species appears as yet to have been described from the Malayan peninsula; though there can be little doubt of its occurrence in the more elevated interior. In the islands, we know only of *P. MONTANUS*, Horsfield, in Java, *P. BORNENSIS*, Cabanis, in Borneo, and *P. ISIDOREI*, Lesson, in New Guinea; all of which belong to the Indian type as distinguished from the Australian type of *POMATORHINUS*, which latter constitutes the *POMATOSTOMUS*, Cabanis, *hodie*.

PHYLLOSCOPUS VIRIDIPENNIS, nobis, n. s. A fourth species of the *Reguloides* subgroup (*J. A. S.* XXIII, 487), and most nearly resembling **PH. CHLORONOTUS**; but readily distinguished from that species by having the rump uniformly coloured with the back, also by having a longer and differently coloured bill, and legs of much darker hue. From **PH. PROREGULUS** (*Regulus modestus*, Gould), it is distinguished by its inferior size and much brighter colouring; the mesial coronal streak being as much developed as in **PH. CHLORONOTUS**, and of a purer yellowish-white contrasting with a blacker shade of dusky: edge of wing considerably brighter yellow than in the others; the wing-band and also the tibial plumes tolerably bright yellow, the latter constituting another good distinction: but a further and more conspicuous distinction consists in the wing beyond its coverts being uniformly green, without a trace of the **REGULUS**-like variegation seen in **PH. PROREGULUS**, and less conspicuously in **PH. CHLORONOTUS**: there is no dusky patch posterior to the coverts, nor whitish tip or border to any of the great alars; but the secondaries are broadly margined with tolerably bright green, and the tertaries are merely of a duller green throughout, brightening on their outer edge, and are not dusky and contrasting (as in the other species). In brief, **PH. VIRIDIPENNIS** may be described to have the upper-parts vivid olive-green, brightest on the margins of the wing and tail feathers: lower-parts albescent tinged with yellow: crown dusky mixed with green, with bright yellowish-white supercilia and coronal streak continued over the occiput, the supercilia more yellowish anteriorly: a broad pale yellow wing-band formed by the tips of the great coverts of the secondaries; and the smaller range of wing-coverts slightly tipped with yellowish: tibial plumes bright yellowish: the margin of the wing pure canary-yellow: upper mandible wanting in the specimen, but the lower is wholly yellow. Legs infuscated-brownish. Length about 4 in., of which tail 1½ in.: wing 2 in.; having the short first primary $\frac{9}{16}$ in., the second $\frac{3}{4}$ in. longer than the first, and $\frac{3}{8}$ in. shorter than the longest primaries. Bill to gape $\frac{1}{2}$ in.; and tarse $\frac{5}{8}$ in.

HYPSSIPETES TICKELLI, nobis, n. s. Very like **H. MACLELLANDII**, Horsfield; but devoid of rufous tinge on the breast and lower-parts, which are uniformly coloured with the throat, and the throat-feathers are less elongated and pointed than in the other: axillaries bright yellow; and much of the under surface of the wing pale sullied yellow: lower tail-coverts dull yellow: upper-parts dull olive-green, slightly washed with rufous on the back; the wings and tail brightish golden-green, much less rufescent than in **H. MACLELLANDII**: crown dingy rufous-brown, the

feathers pale-shafted and pointed, but less elongated than in the other : ear-coverts dull greyish ; and a very faint tinge of ferruginous on the sides of the neck. Bill dusky ; and legs pale brown. Bill to gape $1\frac{1}{8}$ in. ; the latter defended by strong *vibrissæ* : closed wing 4 in. : tail the same : tarse $\frac{5}{8}$ in.

ARBORICOLA BRUNNEOPECTUS, Tickell, n. s. On a former occasion, *J. A. S.* XVIII, 819, we distinguished three species of the Green or Hill Partridges of Anglo-Indian sportsmen,—viz. *A. TORQUEOLA* (*Perdix torqueola*, Valenciennes; *P. megapodia*, Temminck; v. *P. olivacea*, Gray); which appears to be the only species found in the Simla and Masuri hills, and in Sikim inhabits at a greater elevation than the next:—*A. RUFOGULARIS*, nobis, common in Sikim, and which Capt. Tickell has now sent from the Tenasserim mountains ; and *A. ATROGULARIS*, nobis, which is common in the mountains of Asám, Sylhet, if not also those of Arakan. We have since seen many dozens of living examples of the last from Sylhet, and remarked that there is no apparent sexual diversity, and but slight individual variation ; and this we now suspect to be also the case with the second species, the supposed females referred to which formerly we now suspect were that sex of *A. TORQUEOLA*. Capt. Tickell now sends a specimen of a fourth, found together with *A. RUFOGULARIS* at an elevation of from 3000 to 5000 ft. “They are tame and easily shot as they run along the ground.” In *A. RUFOGULARIS*, both sexes appear to have the chin and throat deep ferruginous, the former speckled with black, the latter with an inferior black border more or less developed : breast dark ashy, tolerably pure, and passing to white on the middle of the belly : flanks varied with ferruginous on the sides of the feathers, which have an elongated medial white spot, less developed than in the males of *A. TORQUEOLA* : back plain, or with but the faintest possible indication of terminal dusky margins to the feathers (which must be looked for to be observed at all) : the scapularies with large black spots, and scarcely any trace of white medial lines ; and the crown brown, often black-spotted, and passing to ashy on the forehead.—*A. ATROGULARIS* has a very broad white moustachial streak ; and the throat black, passing into white below, the latter ill defined and spotted with black, the spots gradually disappearing on the pure ashy breast : no trace of ferruginous on the flanks, which have small narrow white spots, often obsolete or nearly so : crown brown, more or less black-spotted, and passing to ashy on the forehead ; and the back conspicuously barred with black, two or three narrow transverse bands upon each feather : scapularies with black spots more or less developed, but with no white mesial streaks, and little trace of rufous or ferruginous.

—*A. BRUNNEOPECTUS* has the breast and flanks tawnyish-brown instead of ashy, with no admixture of ferruginous on the latter, which are spotted quite differently from those of any of the other species; each feather having a large rounded white spot, broad black terminal border, and another spot of black above the white: throat fulvous-white, passing to black in front of the neck, but no white below this as in *A. ATROGULARIS*, nor do the black spots descend visibly upon the breast, though on turning up the feathers, a rudiment appears upon each of the black and white markings which become so developed on the flanks: crown brown, black-spotted, and passing to whitish-brown on sides of forehead: back and scapularies scarcely differing from those of *A. ATROGULARIS*. Beak (of specimen examined) conspicuously larger than in the others.

A. INTERMEDIA, nobis, n. s. We believe this to constitute a fifth species, *probably* from Arakan. It has a black throat, succeeded by a great palish ferruginous patch which nearly surrounds the neck, and is in front spotless, but has large round black spots on the sides of the neck: rest of the plumage nearly as in *A. RUFOGULARIS*, but the general colour paler.

The other species sent by Capt. Tickell are *ATHENE CUCULOIDES*, *MEGALAIMA FRANKLINII*, *HEMICERCUS CANENTE*, *CHRYSOCOLAPTES SULTANEUS*, *GECINUS CHLOROLOPHUS*, *PHENICOPHAUS CURVIROSTRIS*, *HARPACTES ERYTHROCEPHALUS*, *LYNCORNIS CERVINICEPS*, *PSILORHINUS SINENSIS* (var.), *ALCIPPE NIPALENSIS*, *STACHYRIS NIGRIFRONS*, *TEPHRODORNIS PELVICA*, *TURDUS RUFULUS*,* *PRATINCOLA INDICA*, *CYORNIS RUBECULOIDES*, *CORYDON SUMATRANUS*, *EURLAIMUS JAVANICUS*, *SERILOPHUS LUNATUS*, *PSARISOMUS DALHOUSIE*, *PERICROCOTUS*—?† *CAMPPEPHAGA FIMBRIATA*, *HIRUNDO URBICA* (!),‡ *TCHITREA AFFINIS*, *CRINIGER FLAVEOLUS*, *TOLE VIRESSENS*, *HEMIXOS FLAVALA*, *PHYLLORNIS HARDWICKII*, *PH. AURIFRONS*, and *PH. SONNERATII*.

Of the Owl, he remarks—"If this be true *CUCULOIDES*, there is a species in the Sikim hills hitherto unnamed; but which I used to suppose

* *T. RUFULUS*, Drapiez; *T. modestus*, Eyton: Qu. *T. JAVANICUS* (?), Horsfield; *T. concolor* (?), Temminck.

† Capt. Tickell insists that the specimen sent is the female of *P. BREVIROSTRIS*: to us it appears rather that of *P. SOLARIS*, nobis; having a pale throat and dark forehead.

‡ Capt. Tickell writes—"There are great numbers of these here" (at Maulmein) "in the season; and I have also seen large flocks of them in India, but they appear from time to time, not constantly as does *H. RUSTICA*."

was CUCULOIDES. It is coloured almost exactly like A. BRODIEI, from which it differs in its much larger size. The bird I now send is the Tenasserim substitute for my A. RADIATA, which it almost exactly resembles in note and habits: being diurnal and crepuscular; whereas A. BRODIEI and the other above alluded to are strictly nocturnal, and have a very different note."—We can detect no difference between this and other Tenasserim specimens, and others from the Himalaya, and one from Chusan; and have repeatedly received examples from Asám, Sylhet, and Arakan.

"The Barbet," continues Capt. Tickell, "I have shot at Darjiling, where it is not common.* But in the Tenasserim mountains it swarms from 3,000 to 5,000 ft. elevation, not higher, nor lower,—and from the first level it suddenly and entirely supplants M. LINEATA, the *Pokoung* of the Burmese. As long as day lasts, the woods amongst the Dauna hills resound with its cry—*piow, piow, piow*, &c. &c. There is another Barbet, smaller and resembling apparently the M. INDICA, which is also pretty common, from 1,000 to 3,500 ft.; but it settles *solely* on the summits of the hugest trees, calling out *tapral, tapral, tapral*, by the hour together; and I have found it impossible to procure with the gun: so small an object at such a vast height cannot be hit.† Mr. Parish, our chaplain, was with me on one of my excursions, and measured the trunk of one of these giants of the forest which had fallen across a little brook. The smooth bole, before a single limb branched out, was 130 ft. long."

The PHÆNICOPHAUS CURVIROSTREIS and PHYLLORNIS SONNERATII have heretofore been only known as Malasian species. The former was observed by Capt. Tickell "on low jungly hills,—very like PH. TRISTIS in habits: scarce: a pair shot were both precisely similar, except in colour of iris; the male having that cobalt blue, and the female orange. Food Coleoptera, Hemiptera, and very large caterpillars.

"HARFACTES ERYTHROCEPHALUS was common in the hills from 3,000 ft. upwards. Below that it is replaced by H. ORESKIOS. It flies in small troops, and is active and vociferous in the morning, solitary and quiet during the heat of the day, sitting in the shade. It appears larger and brighter than in Nepal and Sikim." The specimens sent are certainly brighter than, but do not exceed in dimensions, others from Darjiling, Sylhet, &c.

* Mr. Hodgson procured it in Nepal; and we have received it from the Khásya hills, and from those of Arakan.—*Cur. As. Soc.*

† Probably M. TRIMACULATA (var. *cyanotis*). *Cur. As. Soc.*

The *PSILORHINUS SINENSIS*, (L.), var., is of the same race which we formerly termed *Ps. magnirostris* in *J. A. S.* XV, 27; the great size of the bill proving merely to be an individual peculiarity; but the colouring is considerably finer and more intense than in Himalayan specimens, which latter (as we are assured) are perfectly similar to examples from China.

The *ALCIPPE NIPALENSIS* (v. *Siva nipalensis*, Hodgson,) was "common, but local, in hilly jungles up to 4,000 ft. I found," adds Capt. Tickell, "LEIOTHRIX ARGENTAURIS and SIVA STRIGULA, about the sides of Mooléit. STACHYRIS NIGRICEPS, in hilly forests, 3000 ft. CORYDON SUMATRANUS is a singular and rare bird. Of its habits little or nothing is known. I can only say that it is crepuscular (very likely diurnal as well), and so stupid and tame as to allow itself to be pelted without moving. EURYLAIMUS JAVANICUS is not common: at least it is not often seen; being very quiet and secluded, though excessively tame, and not crepuscular like CORYDON. SERIOPHUS LUNATUS. These birds are much freer flyers than EURYLAIMUS. I found them once, in a flock, hurrying about like Titmice, but very high up. CALYPTOMENA VIRIDIS. These birds resort to dense thickets when alarmed, but will sally out to feed on fruit (wild figs, &c.), and they mingle with Barbets and other birds in so doing. The note is low and sweet—a mellow whistle. Like the EURYLAIMI, they are tame and stupid.*

"I obtained," continues Capt. Tickell, "the egg of *BUCEROS CAVATUS*; and "have seen with my own eyes that the male builds the female in, by covering the hole in the tree, where she incubates, with mud, leaving only room for her bill to protrude and receive food from his! I thought that this was a fable." (The same is stated in the Rev. J. Mason's 'Tenas-serim,' &c., p. 274.) Of mammalia, Capt. Tickell "got nothing particular. Indeed, I never saw a country so utterly void of large game."

Finally, he obtained the young, about a month old, of the large pouched *Hargila* (*LEPTOPTilos AEGALA*). The fact of this bird breeding in the Provinces was long ago announced to us by Capt. Sparkes; who stated—"With regard to the 'Adjutant's' nest, I was out surveying in December, 1848, in the district of Moulmein, at a place about five miles to the east of the town; and having occasion to ascend some eminence to obtain a

* Of *PSARISOMUS DALHOUSIE*, Mr. Frith informs us, that flocks often ascend to the table-land of Cherra Punji; where, as they fly across the open ground from garden to garden, the native boys hunt them by intercepting and turning their flight away from the gardens, when they are soon fatigued and easily caught by the hand.

good *coup d'œil* of the surrounding country, I determined to climb to the top of the highest peak of the Kharong hills, a detached mass of limestone rock which rises almost perpendicularly out of an extensive level plain, to the height of 600 feet. The ascent was extremely difficult and dangerous, and had never before (as the people assured me) been attempted by an European. On gaining the summit I found that I was immediately over the top of a large tree—which sprung from a crevice in the rock below: and on its highest branches was an ‘Adjutant’s’ nest, composed of dry sticks very rudely interlaced [or merely heaped together?] making a flat platform as it were, with little or no perceptible cavity towards the centre. In this were two young ‘Adjutants,’ about the size of small Geese, covered with a white down, and with pouches and beaks ridiculously disproportioned to their size, being extraordinarily large. Both of the young were taken by one of my Burmese servants. In another similar nest, in an adjoining tree, were one young one, and one addled egg, of a spotless dirty white and somewhat larger than a Turkey’s egg.”

Mr. R. W. G. Frith informs us that he found both of the species of ‘Adjutant’ breeding in the S. E. part of the Sundarbáns. Their nests were placed on the tops of the loftiest trees, and were extremely difficult and hazardous to approach, from the density of the undergrowth and the great number of Tigers which infest the vicinity. In fact the nests were only to be approached by means of the tracks made by Rhinoceroses, Buffaloes, &c., through the jungle. The large or pouched species breeds about a month earlier in the season than the other, immediately (it would seem) after its arrival from the places which it frequents during the rainy season. They are then in the finest state of plumage; ash-grey, with the pale wing-band complete; and, for the most part, they have but just perfected their plumage when they leave Calcutta at the end of the rains. In the same neighbourhood, Mr. Frith was credibly assured that the huge *ARDEA GOLIATH*, Rüppell (*A. nobilis*, *nobis*, &c.),* also bred; and he expects to be able to procure the eggs of all three species during the next breeding season.

A further notice of the ‘Adjutant’ may be here cited. In Lower Bengal, we see the adult birds only during the rains; though the young remain throughout the year, congregating about *abattoirs* and such places. At Masuri, Capt. Hutton remarks—“The ‘Adjutant’ is a sure forerunner of the rains with us, appearing always about a fortnight before they

* These are recognised as distinct by the Prince of Canino. *Comptes Rendus*, XL (1855), p. 722.

commence. They do not alight on the hills, but are seen soaring about high above us in circles. I have seen them regularly every year; and in 1843 noted their first appearance on the 2nd June. They appear to come from the interior towards the plains. I have never seen them *during the rains* on the hills nor in the Deyra Doon."

It is not generally known that our large pouched *Hargila* is also an African bird. Dr. Rüpell notices its occurrence in Nubia and Abyssinia in small flocks.

E. BLYTH.

Corrigenda, for Report for February Meeting, pp. 178 ante.

- p. 178, l. 3 from bottom. "For *NYCTICIGUS*," read *NYCTICEJUS*.
 „ 179, „ 2. For "ceiniger," read *CRINIGER*.
 „ „ note, l. 2. For "*Coccothrauses*," read *Coccothraustes*.
 „ 180, „ 12. For "Tenasserin," read *Tenasserim*.
 „ „ 13. For "*TINUNCULUS*," read *TINNUNCULUS*.
 „ „ 19. For "*CYANOGARULUS*," read *CYANOGARRULUS*.
 „ „ 24. For "*CERERA*," read *CEREBA*.
 „ „ 25. For "*MARILARDICA*," read *MARILANDICA*.

LIBRARY.

The following additions have been made to the library since the last meeting.

Presented.

Mittelsyrien und Damascus, Geschichtliche Ethnographische und Geografische Studien, von Alfred V. Kremer. Wien, 1853, 8vo.—BY THE AUTHOR.

Description de l'Afrique par un Géographe Arabe anonyme du sixième Siecle de l'Hégire. Text Arabe publié pour la première fois par M. A. de Kremer. Vienne, 1852, 8vo.—BY THE EDITOR.

Report of the Calcutta Public Library, for 1854.—BY THE CURATORS.

Thirty-second Annual Report of the Parental Academic Institution and Doveton College.—BY THE PRINCIPAL.

The Upadeshak, No. 99.—BY THE EDITOR.

The Calcutta Christian Observer, No. for March, 1855.—BY THE EDITORS.

The Oriental Baptist, No. 99.—BY THE EDITOR.

Notice Historique sur M. M. Burnouf, Pere et Fils. Par M. Roudet. Paris, 1854, Pamphlet, 4to.—BY THE AUTHOR.

Exchanged.

- The Athenæum, for December, 1854.
The Calcutta Review, for December, 1854.
The Philosophical Magazine, No. 56.

Purchased.

- The Annals and Magazine of Natural History, for January, 1855.
Comptes Rendus, Nos. 23 to 26 of 1854 and 1 of 1855.
Journal des Savants, for December, 1855.
Amīr Hamzah, 1 vol. 4to.

March 31st, 1855.

RA'JENDRALA'L MITTRA.

JOURNAL
OF THE
ASIATIC SOCIETY.

No. IV.—1855.

Examination and Analysis of a Coal from Cherra Punji, received from Messrs. GILMORE and McKILLIGAN.—By H. PIDDINGTON, Esq. Curator, Museum of Economic Geology.

This coal is, on one fracture, a fine bright glance coal. On the cross fracture it is hackly and resinous, and wherever faint lines of stratification can be traced they are again crossed by lines almost perpendicular, though the coal shows no tendency in its fragments to divide cubically, but rather in beds and thick laminae.

When either the powdered or solid coal are exposed to heat in a closed crucible, it is found that they swell up in coking to a curious bright black puffy and froth-like mass, which fills the whole crucible, and is exceedingly tender and brittle. This singularity distinguishes it from all other coal, of which we have any record available here.

It crackles and flies a little in the forceps, and then flames and burns up in long gas-like jets.

The smell of the smoke is that of good Newcastle coal, and has nothing disagreeable or peaty about it.

Its Sp. gravity is,	1.24
Its constituent parts are,	
Water,	00.85
Gaseous matter,	66.00
Carbon,	32.65
Ash (dark grey),	00.50
	100.00

It would thus appear, so far as laboratory experiment can guide us, that this coal is a first rate gas coal, but would not give a coke applicable to any present known use, the coke being in fact a black carbonaceous froth.

As a steam coal, unless it be perhaps with tubular boilers, it would not be found an economical one; as though from its rapid flaming, the steam would be quickly raised, yet from the large proportion of gas, much of it would be unconsumed, and driven up the funnel or chimney, and the proportion of carbon (coke) is too small to keep up a long steady glowing heat, without a fresh supply of coal. If it is used for steam in common furnaces, the most economical method of using it, would probably be to burn two-thirds of Burdwan or other inferior coal to one of this kind.

On communication of these results to Messrs. Gilmore and McKilligan, they shewed me a report from Mr. Ward of Messrs. Jessop & Co. stating that they had found that the coal coked well! Supposing some error, I repeated my own experiment, and obtained from Mr. Ward some of their coal, and of its coke, which was very fine and the coal evidently from the same seam; but upon trying some of it in the same (silver) crucible over a lamp furnace, it produced only the puffy mass, like my former result. I called on Messrs. Jessop to compare notes, and they informed me that from 2 maunds 35 seers of the coal, they had obtained but one maund of coke, or rather less, since it was weighed when damp. This is very nearly our proportion of 33 per cent of carbon and ash, for 100 : 33 :: 115 : 37,73, which was about the true weight of Messrs. Jessop's coke.

The singular fact, however which it teaches us, i. e. that with highly gaseous coal, the same result is not produced on a small scale as on a large one, is highly interesting; and thinking it might be owing to the too sudden application of heat, from the lamp furnace heating the silver crucible quickly to redness, I tried graduating the heat very slowly but without success; so that this is not the cause of this extraordinary difference of results.

*Description of a new species of Hornbill, by Capt. S. R. TICKELL,
Principal Asst. Commr. Tenasserim provinces.*

BUCEROS [TICKELLI, Blyth].

Sex—Female, nearly adult? Eastern base of Dauna hills. District of Amherst, Tenasserim provinces.

Dimensions.—Length $22\frac{3}{4}$ in.; spread 31 in.; wing 1 in.; tail $11\frac{1}{2}$ in. (beyond wing $7\frac{1}{2}$ in.); bill $4\frac{9}{16}$ in.; tarsus $1\frac{13}{16}$ in.; m. toe $1\frac{1}{2}$ in.; greatest vertical depth of bill and casque 2 in.

Details.—Bill resembles with its casque the bill and casque of young *B. BIROSTRIS*. Edges serrated as if eroded, but meeting throughout the length of bill. Casque compressed into a keel-like process, rising rather abruptly from the forehead, and then inclining downwards and forwards with the arch of the bill, with which it amalgamates at about 2 in. from top. Nostrils opening upwards, and pierced in a flattened ridge. Chin and throat feathered except close to bill. Tail pretty long and rounded, centre exceeding outer feather by $1\frac{3}{4}$. For the rest the details are typical, the form and proportions resembling those of *B. BIROSTRIS*, the common “Dhunnès” of India.

Colour.—(Female.) Iris grey, with an inner circle of brown. Bill dark horn, basal half of casque dull orange: orbits nude and dull pale smalt-blue. Legs dark greenish-horn, with pale soles. Head and its blunt occipital crest bistre-brown, the feathers shaftally pale. Upper-parts umbre-brown, dull and opaque, with a slight tinge of olive, and glances of dull green in certain lights. On the remiges this colour darkens, the secondaries and primaries being greenish-black, the latter with their outer margins midway and their tops whitish. Tail, 2 centre feathers as back, with pale tips: the rest greenish black with pale tips. All under-parts rufescent-tawny, brightest on throat, dull and clouded with vinous-ashy below. Auriculars striated bistre, as are sides of neck obscurely. Lining of wings dusky and tawny.

From the written description of the casque and bill of *BUCEROS GALERITUS* (*Journal As. Soc. for 1845, No. 159, p. 187*), I was led to identify the present subject with that species, but am assured

by Mr. Blyth that they differ. The species now under review is therefore new to science.

The district of Amherst (Tenasserim provinces) is traversed for its whole length, north and south, by a continuation of the Yoma-doung or south-eastern Himalaya. This range continues southward through Tavoy and Mergui, and forms finally the backbone of the Malayan peninsula. And along these mountains birds supposed to be peculiar to the peninsula and the Straits on the one side, and restricted to Nepal and the Morung and Terai on the other, are frequently met with. The range (or ranges) in Amherst are about forty miles in breadth (though the mountainous portion of the province seems to dilate as extending southward), and the ridges are for the most part excessively steep, and buried in forests: but rising to more scantily clothed peaks of 7 or 8000 feet elevation. On the lower skirting hills, but especially on the plains at their feet, the soil, watered by numerous brooks and streams, is exceedingly rich, and nourishes trees of prodigious dimensions. The "Thengan" (*Hopea* tree, apud Judson), "Toung-bing," and "Kathy-kha" (trees used by the Talyns for making boats of upwards of 50 tons burden), rise to 150 ft. before producing a branch, their summits attaining a height of 230 feet and upwards; and it is on these giants of the forest that this species of Hornbill reposes and feeds, never being met with in jungle where the trees are of an ordinary size. I met with these birds from the plains up to an elevation of 3,500 or 4,000 ft. above the sea, but not beyond; and they appeared commonest on the easterly skirts of the range, keeping together in pairs or small parties of five and six, incessantly calling to each other in loud plaintive screams "whé-whéyo, whé-whéyo," and when feeding, keeping up a low murmuring cackle like Parrots. Their flight is smooth and regular like that of *BUCEROS PUSARAN*, not in alternate flaps and sails like *B. CAVATUS*, or *ALBIROSTRIS*, or *BIROSTRIS*. And it is performed at great elevations especially when they cross from top to top of the mountains. Keeping ever thus at immense heights, and being withal as quick-sighted and wary as the rest of the genus, it may be pronounced one of the most difficult birds in the world to be procured with a gun. It is, therefore, no matter of wonder, that although large collections of birds have been made in the Tenas-

serim provinces, this Hornbill has never hitherto formed part of them. Amongst the individuals I could see, but not shoot, some were apparently entirely black, and these may be the adult males. The wild Karen who lived nearest to those uninhabited forests knew nothing of the bird.

On a simple method of Manipulation in the Calotype process.—By J. J. GRAY, Esq. Maldah.

In the description of the following process I make no claim to originality, it being merely an adaptation of Fox Talbot's process to suit the requirements of an Indian climate, the mode of manipulation being so simplified that, with ordinary care, failure will be impossible.

Paper.—I prefer Turner's negative calotype paper to all others I have tried.

Iodizing.—I always iodize by the single-wash process, sometimes first washing the paper with a solution of chloride of barium, 12 grains to the ounce of distilled water. I have also used bromide of potassium, but cannot say that I have noticed any particular benefit from its use.

To iodize the paper, the following articles are required:

A sheet of "solah," cork, or soft wood, larger than the paper to be iodized.

A double fold of clean flannel, or sheets of clean blotting paper.

Silver pins, which can be made in any bazar.

A couple of Buckle's brushes, or, what is quite as good, the neck of an Eau de Cologne bottle, with some cotton-wool and a bit of thick thread.

A couple of large dishes, or trays, of glass, wedge-wood ware, or gutta purcha filled with water.

The iodizing solution.—To make which, I quote Dr. Diamond in the 11th No. of the Journal of the London Photographic Society.

Take sixty grains of nitrate of silver, and sixty grains of iodide of potassium, dissolve each separately in an ounce of distilled water, mix and stir briskly with a glass and so as to ensure their perfect mixture; the precipitated iodide of silver will fall to the bottom

of the vessel; pour off the fluid, wash once with a little distilled water, and add 650 grains of iodide of potassium, which should perfectly re-dissolve the silver and leave a clear fluid; should it not (for chemicals differ occasionally in purity) then a little more should be added, until the effect is produced.

Select the sheets to be iodized, carefully rejecting those in the slightest degree damaged or defective; mark the smoothest side with a pencil in one corner, lay the flannel or blotting paper on the solah board, lay the paper marked side uppermost on the flannel and pin it down at the four corners with the silver pins; now dip the cotton brush into the iodizing solution, incline the board and commencing at the top of the sheet; lay on the wash with a steady hand as in laying on a flat tint in water colour painting, taking care that none of the liquid runs, turn the board, and cross the first wash with a second at right angles being careful to obliterate all air bubbles and not to leave an excess of liquid, so as to pool when laid on its back; unpin and lay the sheet on its back on any clean flat surface to dry. Commence upon a second sheet and so on until the requisite number are finished, which depends upon the depth of the dishes used for washing; before the sheets are perfectly dry immerse them carefully in dish No. 1, putting them in one by one, and getting rid of air bubbles by blowing, gently agitate the dish for a few minutes, then change separately to dish No. 2, repeat the agitation, re-fill No. 1, with clean water and shift back the papers, and so on changing the water half a dozen times or until the dripping from the sheet cause no precipitate in a solution of nitrate of silver. I generally find from four to six changes in an hour suffice. The sheets should now be of a pale primrose colour of an even tint on the face, with scarcely any trace of colour on the back.

They are now to be lifted out separately and hung up to dry, pins are apt to tear large sheets, the best plan is to throw them across a wooden rail over which sheets of any clean paper, covered with clean towels have been hung. When dry, they can be put away in a portfolio for use. The whole of this operation may be performed in moderate daylight, and the dry paper may be exposed to the full force of the sun with benefit.

To Excite.—I here diminish the strength of the exciting solution as the heat of the weather increases.

The normal solutions are as follows:—

No. 1.

Nitrate of silver,	30 grains.
Glacial acetic acid,	1 drachm.
Distilled water,	1 ounce.

No. 2.

Gallic acid,	10 grains.
Glacial acetic acid,	$\frac{1}{2}$ drachm.
Distilled water,	6 ounces.

The addition of the acetic acid enables us to keep the gallic acid any length of time without decomposition.

Take 10 minimis of No. 1 and 10 minimis of No. 2 mixed with 3 drachms of distilled water (this is just enough for a sheet 10 by 12 inches) pin the iodized paper face upwards on the solah board as before with clear silver pins, dip a clear Buckle brush in the gallo-nitrate solution, and lay on the wash as described in the iodizing process, lay the board on its back out of the light of the candle for about a minute, then unpin the paper take it up by a couple of corners, and lay it carefully, face downwards, on a dish of clean filtered water, taking care not to wet the back; agitate the dish gently for a few minutes, lift up the paper, allow it to drain for a few seconds and lay it on its back on a clean dry surface, blot off with a fresh sheet of blotting paper, and put it, while still damp, in the dark frame. With a little management, four sheets can easily be thus excited at one time.

If the weather is warm, reduce the quantity of gallic acid to 4 minimis.

If the weather is hot, omit the gallic acid altogether, and a second washing may be given to the paper, if it is required to keep long.

Exposure.—It is impossible to give any safe guide in this part of the process as no two lenses work alike. The shortest exposure I give is 3 minutes, and I have given as much as 15 according to the light.

Development.—Here again I graduate the strength of the solution according to the heat of the weather, or the appearance of the paper when taken out of the dark frame.

In cool weather, and when no trace of the picture is visible on the paper, I use equal parts of the aceto-nitrate and gallic acid as in the normal solution.

As the weather gets warmer or the picture appears more or less on the paper, I decrease the quantity of aceto-nitrate, substituting the gallic acid. This developing solution is laid on exactly as in exciting with a clean cotton brush, the paper being kept wet until the development is complete, and the minutest detail visible. Then unpin the paper and wash in a couple of waters in a dish, after which it may be put into the hypo-sulphate of soda solution (1 oz. to 6 oz. of clean water) and taken into the light. When the picture has lost all trace of the yellow iodide of silver it is fixed and must be immediately washed in many waters for several hours, dried, and finally waxed for the printing process.

Let me add a few cautions to beginners. In iodizing, be careful that the fingers are free from nitrate of silver stains; I have spoiled a whole batch of papers by neglecting this.

See that not a trace of daylight is admitted into the operating-room, the single candle even must be shaded, the light may be allowed to come through the window however, if guarded by a double fold of American sheeting dyed with the wood of the jack-tree.

Should the paper turn brown in spite of all precautions, be assured the glacial acetic acid is too weak; therefore increase the quantity.

Carefully wash out all the vessels used, more especially those in which the gallo-nitrate has been mixed.

Keep the hypo-sulphate of soda at a distance from all the other chemicals, and set separate dishes aside for its use, two solutions will serve to fix many proofs if filtered before use, even after it has become quite black.

A clean flock of cotton-wool must be used for each picture, and for each purpose in the Buckle brush.

I think that the above reduces the calotype process to a simplicity, which can hardly be exceeded: it is also an exceedingly economical one, a matter of no small importance in India, where chemicals are often not to be had, and are sold at such extravagant prices.

*Report on a Zoological collection from the Somáli country.—By
E. BLYTH.*

The collection on which I have now the honor to report was made by Lt. Speke, of the 46th B. N. I., and was forwarded to the Society's Museum by Lt. Burton of the Bombay Service, in command of an expedition into the Somáli territory, or African region bordering on the Red Sea.*

This collection comprises 10 species of mammalia, 36 of birds, 3 of reptiles, 1 fish, a scorpion, and 3 species of *Coleoptera*. The whole of the *Vertebrata* (if not the rest also) being distinct species from any found in this country; save only a *Lynx* (*FELIS CARACAL*), and a Wheatear (*SAXICOLA MELANURA*, Temminck), which latter is figured among the Burnes' drawings from Sindh, though we did not previously possess an example of the species.

The actual novelties are not many; but comprise a highly interesting rodent, in a new generic form affined to the hitherto isolated African genus *CTENODACTYLUS*, Gray; and among the birds, a second species of the *Sturnidous* genus *SPREO*, a handsome undescribed true Sparrow, and a small Floriken remarkable for the shortness of its tarsi. There is also a *Sturnidous* bird, which is probably the *LAMPROTORNIS MORIO* apud Rüppell; but is quite distinct from the species so denominated of S. Africa, from which it is now probably first distinguished.† A *Bayá* (or 'Weaver-bird') sent would seem to be the long lost *Baglefecht* of Buffon, which the older systematists confounded with our Indian *PLOCEUS PHILIPPINUS*, and in Griffith's edition of Cuvier's 'Animal Kingdom' is placed as a synonyme of *EUPLECTES ABYSSINICUS*: and a beautiful small Honeysucker (*NECTARINTIA ALBIVENTRIS*, Strickland, described from the Somáli country,) is now probably only for the second time received in any collection. The reptiles comprise an apparently new Scinque.

* *Vide p. 245, ante.*

† Since the above was written, we find (from a recent No. of the *Comptes Rendus*) that this Abyssinian bird has lately been discriminated by M. Verreaux, who terms it *AMYDREUS RUPPELLI*.

With the exceptions of *FELIS CARACAL* and *OXYLOPHUS GLANDARIUS*, the whole of the species would have been new to the Society's museum, had we not just previously received the collection from Dr. Rüppell noticed in my Report for April of this year;* and which supplied us with examples of *CANIS VARIEGATUS*, *DENDROBATES AETHIOPICUS*, *SAXICOLA ISABELLINA* (?), *PLATYSTEIRA SENEGALENSIS*, *NECTARINIA HABESSINICA*, and *PTEROCLES SENECALENSIS*: but in all of these instances the examples prepared by Lt. Speke are finer, and he has favoured us with both sexes of the *PTEROCLES*.

As acquisitions of especial interest may be indicated the *HYENA*, the Abyssinian *HYRAX*, the little Salt's Antelope (a particularly fine and well prepared specimen), and the new rodent; and among birds the *Bateleur* Eagle, the Hornbill, two species of *PROMEROPS* (a genus intermediate to *BUCEROS* and *UPUPA*), the *CHIZZERIS*, *CORVI*, *BUPHAGA*, *LANIARIUS CRUENTUS*, *HYPHANTORNIS BAGLEFECHT*, the *RASORES*, new Floriken, and *CHENALOPEX* or 'Egyptian Goose,' of which common African bird we did not previously possess a specimen.

In proceeding to details, we distinguish by inverted commas some notes obligingly supplied by Lt. Burton.

MAMMALIA.

CANIS VARIEGATUS, Rüppell. "The Somáli Jackal (male), fine and large: probably on account of the quantity of Sheep's tails which he has devoured. He carries off kids and lambs, rather disdaining garbage; and unless driven away by dogs, he is capable of doing great damage to the flocks. The Somáli call him *Dowao*, دواو."

**HYENA CROCUTA*? (Erxleben), var.? Bright fulvous Hyæna, with dark spots not very distinct, and a black tail-tip: probably of the race termed *H. CROCUTA EUFA* by Fischer, and which Dr. Gray refers to *H. BRUNNEA*, Thunberg (*H. rufa*, Cuv., and *H. fusca*,† Geoffroy), from S. Africa (Pt. Natal); but which is not the 'Strand Wolf' of the Cape colonists (who term the common Spotted Hyæna the 'Tiger Wolf'), or *H. VILLOSA*, A. Smith, which Dr.

* *Vide p. 252, ante.*

† This name more probably refers to the specimen in the Paris Museum described by Cuvier, *Oss. Foss.* VII, 318 (4th edit), and which is evidently *H. VILLOSA*, A. Smith (*Lin. Trans.* XV, pt. 2, 461).

Gray considers to be a S. African variety of *H. STRIATA*, Zimmerman, the common Striped Hyæna of Asia and N. Africa. We have seen *H. VILLOSA* alive, and have minutely compared its skull with skulls of the Spotted and of the Striped Hyenas; and arrived at the conclusion that it was a distinct species, nearly allied to *H. STRIATA*, but with the solitary true molar less developed, though more so than in *H. CROCUTA*.* Dr. Gray even institutes a genus *CROCUTA*, to which he refers as species *Cr. MACULATA* (*Canis crocuta*, Erxleben, *Hyæna maculata*, Humb., v. *H. capensis*, Desmarest), the ordinary Spotted Hyæna, and *Cr. BRUNNEA* (with synonyms as before cited). The Somáli animal is probably the latter. The specimen is a female. "The Somáli call it *Waraba*, وَرَابَة or *Durwa*, دُرْوَد. It is common to all the Somáli country, whines about the camp all night, and devours anything it can find during the day, pulling down camels and even children. The natives have many superstitions about this animal, and you often hear of a man being called *Waraba* after his proper name; the idea being that by rubbing certain plants over the body the magician can convert himself like Mars into a Wolf. In the cold season when the Waraba is hungry he attacks man. The Somális all declare this animal to be a hermaphrodite, copulating and being copulated with alternately." (*Vide* Pliny, VIII, 30; as cited by Cuvier, *Oss. Foss.* VII, 312, 4th edit.)

* *MUNGOS FASCIATUS*; *Herpestes fasciatus*, Desmarest: *Viverra mungo*, Kämpfer; *V. ichneumon*, Schreber (from Buffon, III, t. 19); *H. zebra*, Rüppell; *Ryzæna suricata* apud Children, 'Appendix to Clapperton's Travels'). "Called the *Kadaf*, كَدَاف. These animals run about in large batches, and defend themselves savagely when wounded. They inhabit the plateau, burrow deep, and when pursued endeavour to escape by hiding themselves: yet with characteristic curiosity, they must peep out of their asylum after a few minutes' concealment."

FELIS CARACAL, Schreber. "Called by the Somális *Jumbil*, جُمْبِيل. It is principally found in the plains."

**XERUS RUTILANS*; *Sciurus rutilus*, Rüppell: *X. brachyotus*, Hemprich and Ehrenberg, apud Gray. "Ground Squirrel, called *Dabukálla*, دَبُكَّالَة. It abounds all over the country, burrows especially

* *Vide also* Cuvier, *Oss. Foss.* VII, 319 (4th edit.)

into deserted ant-hills, and under dead trees. The testes of the male are enormous; and the colour of the coat is glossy and brilliant."

*PECTINATOR (*n. g.*) SPEKEI, nobis, *n. s.* "Common Rat. *Batrabbubl*, بربubb. Inhabits stony ground, like the HYRAX." This highly interesting rodent belongs to a peculiar N. African group, of which one species only appears hitherto to be tolerably known, the CTENODACTYLUS MASSONII, Gray.* The animals of this group are clad with delicately soft fur, have very long moustaches, and four toes only on each foot. The palms and soles are naked, the latter to the heel or tarsal joint; and the entire length of the tarse is brought to the ground when walking. Over each claw is a curving tuft of stiffish bristles, more conspicuously developed on the hind-feet; and the innermost toe of the hind-foot has a peculiar combing apparatus, which has been described by Mr. Yarrell in the instance of CTENODACTYLUS MASSONII. "With this comb-like instrument," remarks that naturalist, "the little animals were observed [in the London Zoological Garden] to be continually dressing their soft fur; and the facility with which they managed to reach every part of each lateral half with the toe of the foot

* Vide a notice of the anatomy of this animal, by Mr. Yarrell, in *Proc. Zool. Soc.* 1831, p. 49. A second species would seem to exist in the *Mus gundi*, Rothman, or *Gundi Marmot* of Peunant's 'Zoology'; which, being described to be of the "size of a small Rabbit," and of a "testaceous-red colour," can scarcely (as remarked by Dr. Gray) be specifically identical with Ct. MASSONII, even though from the same country—Barbary. The fur of Ct. MASSONII is pale yellowish-brown; and its tail is described by Mr. Yarrell to be 1 in. long. The *Gundi* is merely stated to have a "short tail." Accordingly, the following (obviously another of the same group and region), with rudimentary tail "but just perceptible to the touch," is probably a third species, which was observed by Capt. Lyon in the mountains north of Tripoli. That traveller informs us, that—"It much resembles a Guinea-pig in form, but is of a light brown mouse-colour. Fur longer than that of a Rat, and very silky; eyes black, large, and prominent. Orifices of ears, which are quite flat against the sides of the head, also black, and free from hair: the tail, or rather a little stump in place of one, is just perceptible by the touch, and from it grows a tuft or bunch of long black hairs. The body is very round and fat, and particularly broad at the shoulders. These animals burrow amongst the rocks. They are eaten with great relish by the natives, and no doubt are very good, as the flesh is exceedingly white and fat, and resembles that of a Rabbit." 'Travels in Barbary,' p. 32.

on that side, as well as the rapidity of the motion, were very remarkable." The muzzle is completely furred; and the rudimentary or short tail is furnished with long hair (as in the SCIURIDÆ). The rodential tusks are narrow and rounded; and in *CTENODACTYLUS* there are only three molars on each side above and below, and which are surrounded with enamel; the upper having one deep indentation externally, the lower being indented on both sides. In our new genus there is a small and simple fourth molar anteriorly above and below; and the next to it above is smaller than the third and fourth, and seems to have no distinct indentation (the molars being, however, much worn away by attrition in the specimen examined). The lower jaw of *PECTINATOR* is very remarkable for shewing no indication even of a coronoid process; a fact not mentioned by Mr. Yarrell in his description of the anatomy of *CTENODACTYLUS*. The condyle is small, and articulates on a level with the crowns of the molars. The auditory bullæ are remarkably large, and are seen from above (as in *CHINCHILLA*).—The ant-orbital foramen is large. Palate contracted, narrowing to the front; and the post-palatal emargination is continued forward to a line with the middle of the last molar. Externally, *PECTINATOR* is distinguished from *CTENODACTYLUS* by having the tail and ear-conch well developed; a smaller eye; and apparently a general adaptation for more diurnal and less fossorial habits. The eyes are scarcely so large as in a common Rat. The auricles are broadly ovoid, sub-nude, with a fringe of whitish hairs on their anterior margin, and a patch of dense whitish fur at base on their outer surface. Length of *P. SPEKEI*, from nose to base of tail, about 6 in.; and tail probably $2\frac{1}{4}$ in., or with hair $3\frac{1}{2}$ in. Tarse with toes $1\frac{3}{8}$ in. Auricle (measured posteriorly) $\frac{1}{2}$ in. The skull measures $1\frac{7}{8}$ in. in length, and $1\frac{1}{16}$ in. in greatest breadth (at the *zygomata* posteriorly); between the orbits somewhat exceeding $\frac{1}{2}$ in. Fur soft and moderately long, of a sandy grey-brown colour, slightly washed with rufous especially on the crown; the basal half of the piles pale dusky: at the *nates*, the fur is more dense and woolly, and rufescent-whitish or pale isabelline: the moustaches are chiefly black, and the longest of them measure about 3 in.: the hairs upon the tail are shorter towards its base, then lengthened as in the Squirrels; these long hairs being of a

sullied or isabella-white for the basal half, and then black with a white tip: hence, in the living animal, the bushy tail would appear whitish along its middle, with broad black lateral and longitudinal bands, which again are fringed externally with dull white: hairs upon the feet whitish, the tufts or brushes over and impending the hind-claws shewing conspicuously: the combing apparatus of the innermost hind-toe consists of some exceedingly harsh and stiff short bristles immediately impending (but shorter than) the claw, and above these again are some equally short bristles which are not quite so rigid; over which is finally the long incurved tuft of finer bristles, the lowermost of which are shorter and more rigid than the upper: on the next toe the same remarkable structure is seen, and more easily *felt*, but is considerably less developed.*

**HYRAX HABESSINICUS*, Hemprich and Ehrenberg: *Ashkoko* of the Appendix to Bruce's Travels; recognised as a distinct species by Dr. Gray; but referred by Dr. Rüppell to *H. DAMAR*, Cuvier, v. *SYRIACUS* of Schreber. Half-grown specimen. "The Somál call it *Bauni*, بوني. It inhabits rocky ground and delights in sunning itself, running about the rocks, and living in chinks and holes. Neither Lt. Speke nor I ever saw it in the plains. The Arabs here eat it, but the Somál do not."

**GAZELLA* —? Heads of male and female, of one of the

* This discovery of a second generic form of a peculiar group, hitherto represented only by *CTENODACTYLUS* (which has long stood quite isolated among other *Rodentia*), will be hailed with some satisfaction by those who have paid attention to the classification of the Order, and will tend to remove such doubts as may exist of the propriety of recognising this as a separate family (however limited, according to present knowledge), about equivalent to the *CHINCHILLIDÆ* of S. America, to which, upon the whole, the *PECTINATORIDÆ* would seem to be more nearly affined than to any other known form. It is highly probable, however, that more species and even generic forms remain to be discovered of this peculiarly African family; and that it will prove to be at least as extensive as the *CHINCHILLIDÆ*; and perhaps that even *PETROMYS* should be admitted within its extreme confines. Capt. Lyon's Tripoli animal, with tail reduced to a mere tubercle, is certainly one species which has not yet been scientifically examined; and the *Gundi Marmot* of Pennant is probably another: but these little mouse-coloured rodents seldom attract the attention of unscientific collectors; unless, indeed, it should so happen that their attention had been especially directed to them.

several species which have been more or less confounded under *G. dorcas*; and quite distinct from the common Aden Gazelle, which is frequently brought alive to Calcutta. One marked peculiarity consists in the ears being of an ash-grey colour, contrasting strongly with the hue of the neck and doubtless also of the body. Horns robust, curved backward and then upward, and diverging but slightly; much longer, and with the annuli wider apart, than in the Aden Gazelle, though the animal would seem to be of the same size. The horns of the female are very much stouter than we have seen in any other female Gazelle, and follow the same curve as in the male, having rudimentary annuli. Muzzle whitish, with a strongly contrasting black nose-patch. The Society possesses a species of Gazelle (habitat uncertain), which much resembles the Aden Gazelle except in being considerably larger, with proportionally longer and more distantly knobbed horns, much as in the present race: but both of these have the ears rufescent and not ashy. At present, we are far from being satisfied with the manner in which Dr. Gray has brought together sundry of these affined races of Gazelle, in the *Proc. Zool. Soc.* for June 11th, 1850 (*Ann. Mag. N. H.* VIII, 1851. p. 131). It seems like cutting rather than unravelling of the tangled knot. Lt. Burton writes—"A kind of Gazelle called by the people *Dera*, دره; as you may observe that there is an elevation of loose replicated skin upon the nose. It seems to live during the dry season without water, and affects the desert, not being very shy in presence of man, but avoiding jungle. They are found in flocks."

**MADOQUA SALTIANA*; *Antilope saltiana*, Blainville; *A. madoqua*, H. Smith. A beautiful skin of a male; and heads of two other males and of a female. "This little Antelope is called *Sagaro*, سگارو, by the Somál; *Beni Israel* in Abyssinia; and *Ghazalah* by the Arabs. It abounds throughout the country generally in pairs, and is fond of ravines under hills, the beds of nullahs, and patches of desert vegetation. In the northern Somáli country, these Antelopes are caught in snares: elsewhere they are run down on foot, taking half a day on account of their great swiftness. The Jackal (*CANIS VARIEGATUS*) cannot catch them. They sleep by day under the trees; and in the plains their dung (which becomes peculiarly fetid with a musky odour in the sun) is found in heaps as if they

assembled for that purpose." Many animals resort habitually to one place to deposit their dung: among them the Indian Rhinoceros, which in the Rajmahal hills is watched, for and shot by the natives at such places; and we have observed the Indian Four-horned Antelope to exhibit the same propensity, when tame and loose in a large enclosure.

**OOREOTRAGUS SALTATRIX*; *Antilope oreotragus*, Forster: *A. saltatrix*, Boddaërt. The 'Klip-springer' of the Cape colonists. Head of female, and one fore-foot. "A kind of Antelope called *Alakrut*, الـاـكـرـت. They live in the higher ranges of the mountains, only in pairs, and are not unlike the Musk-Deer in coat. They are by no means shy, seldom flying before the foot-fall is heard. They hop in an awkward manner on the points of the hoof, at no great pace or distance at a time. The people of the country prize the venison."

AVES.

PÆOCEPHALUS RUFIVENTRIS, (Rüppell). "The only species of Parrot observed in the Somáli country. These birds fly in considerable numbers; and they have red irides."

**HELOTARSUS ECAUDATUS*, (Daudin): *Bateleur* of Levaillant. "Called *Nabodi*, نبودي. There are many superstitions about this bird, and its shadow is supposed to be injurious to children. This may be accounted for by the habit it has of swooping down upon any one carrying meat. It devours the small Antelopes and birds, and generally soars high, but I have seen it wheeling close overhead. The female lays one egg in a large loose nest of sticks on the top of tall trees, and if the egg be taken she abandons her home. Irides red."

**MELIERAX POLYZONUS*, Rüppell. "A kind of red-eyed Sparrowhawk, very swift. The people call it *Hatkaadag*, هاتـکـادـگـ."

**BUBO (?) AFRICANUS*, (L.), Temmink, p. c. 50. Called *Shimir libah*, شـمـيرـلـبـاهـ, the "Lion-bird." This is probably the species so identified by Rüppell, though not well according with the descriptions to which we have access. Size of ordinary *Asio* (v. *Otus*), but the auditory aperture as in *Bubo*. Length about 16 in.; of wing 12 in.; and tail 7 in. Colour rufous-brown above, speckled and variegated with dull black, and some oval white spots bordering

the scapularies and upon the wings : lower-parts barred with narrow transverse dusky rays, each margining a broader rufous band ; tarse almost spotless dull white : primaries and tail banded. Head and neck (with aigrettes) rufous, each feather having a terminal blackish spot, extending up more or less as a medial streak : facial disk black-tipped ; and the radiating plumlets whitish, tinged with rufous.

**BUCEROS* (*TOCKUS*, Lesson,) *FLAVIROSTEIS*, Rüppell. "A common bird, called by the Somál *Kudunkutu*, كُدْنَكْتُو. He makes a loud quacking noise, not unlike a frog ; is fond of the jungle trees, and is noisy about sunrise."

**PROMEROPS SENEGALENSIS* (?), Vieillot : *Nectarinia melanorhynchos* (?), Licht. "A bird with an offensive smell ; flies in flocks, and feeds in acacia trees. It is numerous on the plateau." This is distinct from the Cape species, *Pr. ERYTHRORHYNCHOS*, (Latham) ; but may perhaps be the Abyssinian bird which Dr. Rüppell refers to the latter (*Systematische uebersicht*, &c., p. 28). Beak black, but red internally : not much curved, and measuring $2\frac{3}{8}$ in. (in a straight line) from gape to point : wing $5\frac{3}{4}$ in. ; and middle tail-feathers 9 in. The white spots on the wings and tail are considerably more developed than in the Cape species, and extend quite across six of the primaries, without being divided by black along the shaft of the feather. The coloured glosses also are less splendid than in the Cape bird, save chiefly on the throat.

**Pr. MINOR*, Rüppell. Two specimens, male and female ; the latter having a considerably smaller and still more arched bill. "This bird makes a loud noise, and inhabits large trees, especially the acacias."

DENDROBATES ETHIOPICUS, (Ehrenberg). "Heard tapping the hollow trees, like the Woodpeckers of Europe. These birds abound on the plateau. They are called *Daudaulay*, دَوْدَلَي, from the sound."

**DENDROMUS HEMPRICHII*, Ehrenberg. "This small Wood-pecker is commoner than the last, and also inhabits the plateau."

**CHIZLERIS LEUCOGASTER*, Rüppell. "Called in some parts of the country *Gobiyán*, گوپیان ; in others *Füt*, فَت. It is a noisy bird, with a loud cry, and has all the cunning of a Magpie when pursued. It is fond of the thick trees on the banks of ravines. The Arabs call this bird *Kakatua*, and consider it a species of Parrot."

OXYLOPHUS GLANDARIUS, (L.) "Only this specimen obtained."

***CORVUS AFFINIS**, Rüppell. Two specimens. "Common all over the country. Somáli, *Tukka*, *K*.

"In the Harar hills I remarked another variety, very large, with a bright white patch on the back of the head, and a tremendous beak, arched and exceedingly hard. It is a very strong bird, taking a powerful load to kill: my Somális had never seen it before." The **CORVULTUR CRASSICOLLIS**, Rüppell, is here intended.

***C. UMBRINUS** (?), Sundevall. Not having seen a description of this bird, we are not quite certain that it is correctly identified; especially as the late H. E. Strickland remarked of it, after noticing **C. SCAPULATUS** (**PHEOCEPHALUS**, Cabanis),—"Distinguished by the length and curvature of the beak, and by the grey-brown tint of the head and neck."* In the Somáli specimen under examination, the beak resembles that of **C. SCAPULATUS**; and there is a further general agreement of size and structure, extending to the shape of the feathers. The bird was evidently young, and a dull brown tint prevails on the plumage, especially on the head and neck, which might well have suggested the appellation *umbrinus*. Can it, however, be the *young* of **C. SCAPULATUS**? Lt. Burton writes—"A common Crow. Sometimes the breast-feathers are tipped with white, in small semi-circles extending as far as the abdomen. The Somáli do not distinguish between this and the other Crow." On the other hand, may it be a variety of **C. SCAPULATUS**, as **C. CORONE** is certainly a black variety of **C. CORNIX**,† and as the black variety of **C. SPLENDENS** which inhabits Burma?

***AMYDRUS RUPPELLI**, Verreaux; *Lamprotornis morio* apud Rüppell, but distinct from **A. MORIO**, (L., *verus*), of S. Africa. Male and female. As compared with fine specimens of both sexes of the Cape species, this bird has a shorter and deeper bill, with more arched upper outline; longer wings; and much longer tail: but the colouring of the plumage is nearly the same; except that in the female of the northern bird, the head, neck, and breast, are paler and *unmixed* ash-gray; and in both sexes there is much more black tipping the primaries. Both have the rudimentary first primary black; but in the Cape species, the rest have both

* *Ann. Mag. N. H.* IX (1852), p. 345.

† We possess an intermediate specimen from Norway.

webs rufous to very near the tip; whereas in the northern bird, the black is continued along the outer web to near its emargination, and also far up the margin of the inner web: in the second (or first developed) primary of *A. RUPPELLI*, the outer web has its terminal $\frac{2}{3}$ black, and the inner web its terminal $\frac{2}{3}$, the two colours being distinctly defined apart; whereas the corresponding feather of *A. MORIO* is rufous throughout, passing insensibly into weak dusky at tip, and along the margin of the inner web. In *A. RUPPELLI*, the length of wing is—male 7 in., female $6\frac{1}{2}$ in.; middle tail-feather—male 8 in., female $7\frac{1}{4}$ in.; bill to gape $1\frac{1}{4}$ in., and fully $\frac{3}{4}$ in. in vertical depth. The corresponding measurements in *A. MORIO* are—6 in. and $5\frac{3}{4}$ in., $5\frac{1}{2}$ in. and 5 in., and $1\frac{5}{8}$ in. by $\frac{5}{16}$ in. “This bird is found all over the hills, follows the cattle, and flies in flocks seldom exceeding 6 or 7. The eye is dark.”

**LAMPROTOURNIS SUPERBA*, Rüppell. “A kind of *Maina*, called *Zhimber-load*، لمبر لواه, the ‘Cow-bird.’ It is found in large flocks, and is fond of cows, whence its name. Irides white.”

**SPREO ALBICAPILLUS*, nobis, n. s. Length about 12 in.; of wing $6\frac{1}{2}$ in.; and tail $4\frac{3}{4}$ in., its outermost feathers $\frac{2}{3}$ in. shorter: bill to gape $1\frac{3}{16}$ in.; and tarse $1\frac{3}{8}$ in. Colour dull metallic green, with a white cap, vent, lower tail-coverts, tibial plumes, flanks posteriorly, axillaries, and under wing-coverts: rest of the lower-parts with narrow brownish-white mesial streaks to the feathers, which are sub-acuminate, and but slightly streaked on the chin and throat: secondaries chiefly dull white on their exterior webs, forming a large patch on the wing. Bill and feet black. As compared with the Cape species, *SPRE. BICOLOR*, (Gmelin; *Lamprotornis albiventris*, Swainson), the bill is less slender and Thrush-like, having more of the *LAMPROTOURNIS* form; and the tarsi are shorter: but we do not hesitate to refer it to the same genus. “Its Somáli name is *Hanagur*, حین اگر. The eye, like that of the *Maina*, is white; and it flies in large flocks.”

**BUPHAGA ERYTHRORHYNCHA*, Stanley. *Hurio*, هریو. “This bird clings to Camels, and injures the wounded by picking out parasites and larvæ. Its eye is a light and brownish red. Habitat generally the plateau above the hills.”

**HYPHANTORNIS BAGLEFECHT?* (Vieillot). This bird seems to agree sufficiently with Buffon’s description of *le Baglefecht*.

Length about $6\frac{1}{2}$ in.; of wing $3\frac{1}{4}$ in.; and tail $1\frac{7}{8}$ in.: bill to forehead 16 in.; and tarse $\frac{3}{4}$ in. Crown and under-parts bright golden-yellow, paling a little or passing to a purer yellow on the belly and lower tail-coverts, including the tibial plumes: back greenish-yellow with dusky mesial streaks; upper tail-coverts and tail yellowish olive-green, the rump somewhat yellower: wings dusky, the small coverts margined with greenish-yellow, the greater coverts and tertaries with pale yellowish-brown, and the primaries with dull yellow: lores, ear-coverts, chin and throat, black, passing backward as a straight line from the nostrils, so as just to include the eyes. Bill infuscated, probably changing colour according to season; and feet brownish-carneous. "This bird flies in large flocks, and is fond of flowers, blossoms, and grass-seeds; avoiding jungle and trees."

**PASSER CASTANOPTERUS*, nobis, n. s. Length about 5 in.; of wing $2\frac{3}{4}$ in.; and tail 2 in. Structure typical. Crown and occiput, scapularies and wing-coverts, vivid light chesnut: back, rump, and upper tail-coverts, greenish olive-grey, the first black-centred: cheeks and lower-parts clear pale yellowish, sullied with olive on the flanks: the usual black gular mark, extending down upon the breast; and the lores and feathers at the base of the lower mandible also black: a trace of a white wing-band; and the great alars and caudals dusky, more or less pale-edged, the margin broadest and more rufescent on the tertaries. Bill and legs as in *P. DOMESTICUS*. "This species of Sparrow affects the jungles."

**P. (?) TRISTRIGATUS*; *Serinus tristriatus*, Rüppell. Bill typically formed; the white gular mark as in *P. GULARIS*, Lesson (*P. simplex* apud Swainson), of W. Africa: feet and claws more slender and delicate than in other Sparrows; and the plumage soft and lax. "Inhabits the mountains, and flies in flocks."

"The common English Sparrow does not exist in the part of the Somáli country visited by Lt. Speke: and it is generally asserted that it cannot live in Aden. The experiment of transporting them was tried by an officer, who brought from Bombay a batch of Sparrows and Crows. The former soon died; and the latter lingered through an unhappy life, became mangey, and (to judge from the absence of young) ceased to increase and multiply."

**PYRRHULAUDA LEUCOTIS*, (Stanley). "Found only at the village

of ‘Goree Bunder’; the female has no black upon the breast, and somewhat resembles our Hedge-sparrow (*ACCENTOR MODULARIS*) in colour, only that she is a lighter.”

**LANIARIUS CRUENTUS*, (Ehrenberg). “By no means a common bird. The Somális call it *Idatris*, ادتریس.”

PLATYSTEIRA SENECALENSIS, (L.).

SAXICOLA ISABELLINA, Rüppell, *Atlas*, pl. 34, f. b.: according with the figure cited, except in having a greater extent of black tipping the tail-feathers, viz. $1\frac{1}{2}$ in. on the outermost: but apparently distinct from the species sent by Dr. Rüppell himself as his *S. ISABELLINA* (p. 260, *ante*), however closely affined. In the latter the short first primary measures 1 in.; in the Somáli bird $\frac{3}{4}$ in. only, being also considerably narrower. In Dr. Rüppell’s bird, the crown is fuscous, and the upper parts are much infuscated; the lower dull ferruginous with white throat, and the lower tail-coverts deeply tinged with ferruginous: lores black, surmounted by white, which is continued into a slight supercilium; and the outermost tail-feather is black for its terminal $1\frac{1}{4}$ in.: tertaries broad, measuring about $\frac{5}{8}$ in. across; and the bill somewhat broader than in the other, especially at base. The Somáli bird is pale sandy-isabelline above, still lighter below and without a tinge of ferruginous; and the tertaries are about $\frac{1}{2}$ in. in breadth: both have the upper tail-coverts white; and they agree in dimensions. “Inhabits the plateau.”

**S. MELANURA*, Temminck. “Inhabits the plateau, and loves small trees.” There is a figure of this bird, from a specimen obtained in Sindh, among the drawings of Sir A. Burnes and Dr. Lord.

**DICRURUS LUGUBRIS*, Ehrenberg. “This ‘King-crow’ follows the flocks, perching upon animals, and balancing itself upon the waving plants. Irides red.”

NECTARINIA HABESSINICA, Ehrenberg. “A Honey-bird, lighting upon flowers, and avoiding jungle.”

**N. ALBIVENTRIS*, Strickland, Jardine’s *Contr. Orn.* Male and female. “Seen in pairs; and like the last inhabits the plateau above the hills.” This species has only been obtained in the Somáli country.

PTEROCLES SENECALENSIS, (Latham): *Pt. guttatus*, Lichtenstein.

Male and female. "This has all the habits of the corresponding Indian bird" (*Pt. EXUSTUS*, which is likewise African), "and is found on the plateau, where huge flocks abound. It is called *Fuku*, فُقُوْ."

**Pt. LICHTENSTEINI*, Temminck. Lt. Burton mistakes this for the Indian 'Painted Rock Pigeon' or 'Painted Grouse' of sportsmen (*Pt. FASCIATUS*) ; to which it is generally affined, but readily distinguishable upon comparison, being a considerably larger bird, &c. He remarks, that "it is the *Katá*, كَاتَةً, of Arabia, and is here called by the same name as the last, *Fuku*. It flies in flocks, and goes to great distances every evening to find water. If disturbed at the well, it flutters about with piercing cries. In Arabic poetry, it is used as a simile to express great swiftness."

**PTERNESTES RUBRICOLLIS*, (Latham). Male and female. "Common in the Somáli country. The natives call it *Dignin*, دِگْنِينْ ; the Arabs *Dijajat el bar*, دَحَاجَتُ الْبَرْ, or 'wild hen' ; and the Persians (I believe) *Kabk*, كَبْكَ. It represents the domestic fowl in E. Africa ; and its flight and run resemble those of the Guinea-fowl. It is a strong bird, requiring heavy shot, and has a game flavour. The Somáli have a prejudice against eating these, as well as other birds."

**SCLEOPTERA GUTTURALIS*, (Rüppell). "Found on the top of the mountains, and not observed on the plateau or on the maritime plain." This is one of the African Partridges classed in *FRANCOLINUS* by Dr. Rüppell, Dr. A. Smith, and others ; but which do not range well with the Asiatic *Fr. VULGARIS*, *Fr. PICTUS*, *Fr. CHINENSIS* (Osbeck, v. *perlatus*, Gmelin, of China, whence introduced into the Mauritius, and there known as the 'Pintado Partridge'), and *Fr. PHAYREI* (of Pegu). They form a particular group, which is peculiar to Africa.

"Lt. Speke saw, but did not procure, a species of Corn Quail. I also observed many small Quails in the northern Somáli country, In the Gudabuzi country I observed the usual Dove of these climates, a fine large blue Pigeon like the 'Blue Rock' of India. The natives called it *Elal Jag*, إِلَّاجَجْ, or the 'haunter of wells.'"

**SYPHEOTIDES HUMILIS*, nobis, n. s. "A Floriken with bright yellow iris, called by the Somális *Waradada*, وَرَادَادَةً, وَرَادَادَةً. Its cry is a

loud *Ka-ke-rak*. It is found in the plateau among heather" (low herbage), "and is not so shy as the Indian bird" (meaning probably the *Likh* of Bengal or 'Floriken' of S. India, S. *AURITA*). "Its pair [the male s] is smaller, and the feathers below the lower mandible are black."

A small and undoubtedly new species, remarkable for its very short tarsi. Plumage similar to that of a pale female S. *BENGALENSIS*; but the neck tinged with ashy, and the crown more fully crested: wings white underneath, but the long axillary feathers black; primaries dusky-brown, not banded; the secondaries blacker; and a large white spot formed by the basal $\frac{2}{3}$ of the coverts of the primaries: throat speckled with black. Length of wing $9\frac{1}{2}$ in.; of tail 5 in.; bill $1\frac{1}{8}$ in.; and tarse $2\frac{1}{2}$ in. only. A female specimen, to all appearance.

"Lt. Speke also observed a large species of Bustard" (probably *EUPODOTIS ARABS*). "Ostriches are found all over the Somáli country: they are very shy, and at about 3 p. m. disappear to hide themselves for the night. The natives say that the Ostrich is blind at night, and that they can then easily be killed."

**CEDICNEMUS AFFINIS*, Rüppell. Well distinguished from *O. CREPITANS*. "Called *Hedinhitu*, هدنهيتو, a name also given to a smaller Plover. It is half blind during the day, and may almost be ridden down, as it rises under the horse's hoofs with a loud cry. The eye is a light yellow. Its habits correspond with those of the Indian bird" (*O. CREPITANS*). It is found in all the upper regions of the Somáli country.

**CHENALOPEX EGYPTIACUS*, (L.) "Called *Etal-Jaz*, اتلچاڭ, 'who lives at wells.' It was found on the plateau at a brackish spring, and never observed on the coast."

**PHALACROCORAX LUGUBRIS*, Rüppell (*Carbo melanogaster*, cuv., *Par. Mus.*) "A common palmipede, shot on the sea-shore."

REPTILIA.

The reptiles consist of two Lizards and a Snake, neither of the former full grown.

**AGAMA RUDE RATA*, Olivier (*A. mutabilis*, Merrem, &c.) A small specimen apparently of this or a closely affined species, with tail

not much longer than the head and body, exceedingly compressed throughout, and somewhat serrated above and below.

**TILIQUA BURTONI*, robis, n. s. Small and young individual, $5\frac{1}{2}$ in. long, of which tail $3\frac{1}{2}$ in. Very like *T. RUFESCENS* of India; but the auditory orifice conspicuously smaller, and a series of broad scales along the upper surface of the tail: occipital group of plates also differently formed. Colour dark, with the two pale streaks upon the head and body strongly contrasting; and the throat freckled with dusky.

**PSAMMOPHIS SIBILANS*, (L.); *C. moniliger*, Lacepede. Var.? Apparently one of the many varieties of this common African Sand-snake, of a plain pale sandy-brown colour, somewhat more ruddy on the sides, and paler below; a dark brown streak passing through the eye, but no stripe on the body; the labials and sides of the abdominal plates obscurely and minutely freckled with buff-colour on a whitish ground. When the body is bent, the dark skin between the scales shews at the tip of each (on the convex side of the bend), imparting a speckled appearance: 17 rows of scales; scutæ 172; scutellæ 90 pairs. This Snake, according to Lt. Burton, is "called *Mas*, مَسْ, in Arabic *Hansh*, حَنْشٌ. It infests the lower hills (this specimen was found upon the plateau), and is much feared by the natives when travelling at night. It is said to be very venomous. There are many other varieties." It is not venomous.

PISCES.

**TETRODON DIADEMATUS*, Rüppell. This is the only fish sent.
And of

ANNULOSA.

A Scorpion and three species of *Coleoptera*.

*Notes on the Languages spoken by the Mi-Shmis, by W. ROBINSON,
Esq. (Communicated by the Government of Bengal).*

The mountain tribes, known to the inhabitants of Assam under the general appellation of Mi-Shmis, occupy those ranges at the north-eastern extremity of the valley, that stretch in the form of a crescent from where the Di-bong debouches into the plains, on the West, to the mountains inhabited by the Singpho tribes, on the East.

Whatever may be the origin of the term *Mi-shmi*, as applied to these mountaineers, it is not recognized by themselves, except in their intercourse with the people of the plains.

Like most other mountain tribes they are divided into a vast number of petty clans, each of which has a nominal head, but these seem so intimately connected with each other, that it is difficult to ascertain in what consists the difference that separates one clan from another. Their lingual peculiarities, however, separate them into three distinct divisions, and, adopting the name of the three great tribes among whom these differences of language prevail, we may class them as the *NEDU* Mishmis, the *TAYING* or *ME-ME* Mi-Shmis, and the *MIJHU* Mi-Shmis.

The Nedu or, as the Assamese generally designate them, the *Chuli-Kotá* Mi-Shmis, from the circumstance of their wearing their hair short, are the most western of the Mi-Shmi tribes. They occupy the mountains on both banks of the Di-bong, and speak a language peculiar to themselves, yet bearing some affinity to that spoken by their neighbours the Abors and Miris.

The Taying (Taen) or Me-me Mi-Shmis, extend eastward from them to the right bank of the Lohit—the Brahmaputra, while those tribes on the left bank of the great river, are known as the *Mijhu* or *Mai-jhu* Mi-Shmis. These latter possess many vocables in common with the Singphos, showing the existence of an affinity in the two languages that might have been expected from the geographical position of the tribes speaking them.

At the close of the year 1844, Capt. E. A. Rowlatt, undertook a tour into the Mi-Shmi hills, and his Report of the Expedition was

published in the XIV. Volume of the Asiatic Society's Journal, (see p. 477). I fear I can add nothing of importance to the valuable information he then communicated regarding the manners and customs of this people. I shall, therefore, confine myself on this occasion to a few notes on the grammatical peculiarities of two of the Mi-Shmi dialects, the Taying and Mi-jhu, the only two I have yet had an opportunity of investigating.

The Language of the Taying and Me-Me Mi-Shmis.

OF NOUNS.

Nouns admit of no variations expressive of *number*; the plural state is generally defined by a numeral, or some other word expressive of quantity. Thus; Nkoe, a *dog*, Nkoe Ka-prei, *four dogs*, Nkoe-Su-Newe, *many dogs*.

Nor are the accidents of *case*, distinguished by any inflections or differences of termination. The genitive case is denoted merely by the *juxta-position* of the two substantives; the former being understood to be in the genitive case, e. g.

Tamium lami, *the monkey's tail.*

Machom hari, *the root of the tree.*

Maji ru, *the buffalo's horn.*

The accusative is the same as the nominative, and is distinguished only by its position in the sentence.

Ha teku bri no, *I want to buy paddy.*

A ro lum ma-bie, *the boy will not catch the goats.*

The other relations of nouns are marked by the use of post-positive particles.

Gender, in individuals of the human family, is marked by the use of distinct terms. For example :

Mawa, *man*—mia, *woman.*

Naba, *father*—nama, *mother.*

Ayewa, *son*—ayia, *daughter.*

Pamyo, *younger brother*—mathie, *younger sister.*

In the case of the inferior animals, the appellatives karü, *male*, and tassi, *female*, are added to the noun. E. g. Majari karü, *a male cat*—majari tassi, *a female cat.*

Nkoe karü, *a dog*—nkoe tassi, *a bitch*.

Machu karü, *a bull*—(bos) machio tassi, *a cow*.

The only exception to the general rule is in the case of the domestic fowl—inteo.

Inteo tala, *a cock*—inteo tassi, *a hen*.

OF ADJECTIVES.

Adjectives do not alter their terminations to express either number, case or gender. The position of an adjective in a sentence is invariably after the noun it serves to qualify.

Nye-chi che-bwa, *sweet milk*.

Machi ji-eh, *a broad river*.

Phaji a hungya, *a ripe plantain*.

As the language rejects terminations of every kind, it of course has none to make the degrees of comparison. The deficiency is in some measure supplied by shortening or prolonging the adjective in articulation. For example ; ká-jem katyoa, *a short cloth*. When it is intended to convey the idea of *a very short cloth*, the qualifying word katyoa is uttered with a short and abrupt sound.

Alyim kálong, *a long road*. By lengthening out the sound of the adjective, kálong, the idea conveyed would be that of *a very long road*.

The mode of *numeration* that obtains among the Taying and Me-me Mi-Shmis, presents us with a few interesting peculiarities. The system is emphatically a decimal one.

- | | |
|--------------|--|
| 1. E-Khing. | 11. Halong Khing. |
| 2. Ka-ying. | 12. Halo-kaying or Halo-raying. |
| 3. Ka-chong. | 13. Halo-rachong. |
| 4. Ka-prei. | 14. Halo-raprei. |
| 5. M-angu. | 15. Halong manga. |
| 6. Tharo. | 16. Halong tharo. |
| 7. Uwe. | 17. Halong uwe. |
| 8. Elyem. | 18. Halong elyem. |
| 9. Konyong. | 19. Halong konyong. |
| 10. Halong. | 20. Halong-halong, vel
Kaying halong. |

30. Kachong halong, the unit following the decade in regular order.

40. Kaprei halong.
 50. Manga halong, &c. &c.
 100. Malum, 1000 Re-jong.

There are no ordinals in the language.

OF PRONOUNS.

There is no distinction of gender in the pronouns of this language. In the case of the 1st and 2nd person, the sex is supposed to be known, and in the 3rd person it must be inferred by a reference to its antecedent.

THE PERSONAL PRONOUNS ARE—

<i>Singular.</i>	<i>Plural.</i>
1st Há. <i>I.</i>	Hing long. <i>We.</i>
2nd Nyó. <i>Thou.</i>	Nyó long. <i>Ye.</i>
3rd Mtá. <i>He or she.</i>	Mta long. <i>They.</i>

The relations of cases are denoted in the same manner, as already exemplified with reference to nouns substantive.

The Demonstrative Pronouns are Esá the proximate, and Hisá, the remote. These are reduplicated to denote the plural.

Esá-esá *these*, and Hisá-hisá *those*.

The Interrogative Pronouns are Sáhá, *who?* Esá-há, *which?* and ságehá, *what?*

Relative Pronouns are very vague, so much so indeed, that I am unable to speak with precision of the existence of any, sentences being in general so rendered as to obviate the necessity of them. Thus, instead of the phrase, “*the man who died*,” a Taying would say, Nme siyoge-á, *the man he died or the dead man*. So also the phrase Tou-chi bri-á—“*the oil it was purchased*, would be used for, *the oil which was purchased*.”

OF VERBS.

The various kinds of verbs in this language must be denominated wholly from their meaning and signification, as active, passive, neuter, causal, &c.

The relations of time are expressed by affixes, except in the *present tense*, which may be taken as the root of the verb; and only three Tenses can be traced in the language, viz. the Present, the

Past and the Future. Verbs undergo no modification consequent on number or person.

INDICATIVE MOOD.

Present Tense.

Há átyá, *I speak*; Nyo átyá, *Thou speakest*; Mta átyá, *He speaks*; so also, Há de, *I sit*; Nyo dwe, *Thou standest*; Mta chu, *He runs*.

The *Past Tense* is formed by the addition of á; Há átyá-á, *I did speak*; Há de-á, *I did sit*; Nyo dwe-á, *Thou didst stand*; Mta chu-á, *He did run*.

The *Future Tense* is formed by adding Ande or Ende to the root of the verb. Há aty-ande, *I shall speak*; Nyo de-ande, *Thou wilt sit*; Mtá chu-ende or chuyende. *He will run*.

Gerund.

The language has no affix to mark the Gerund or to indicate the Infinitive Mood; the position of the verbs in a sentence being considered sufficient to indicate their meaning.

1 2 3 4 1 4 3 2
Mta teku bu no, *He wants to buy rice.*

1 2 3 4 1 4 2 3
Mta machom teo te, *He cuts down the tree to sell it.*

In some few instances, however, the particle ge, is used after the verb, apparently as the sign of the Gerund.

1 2 3 4 5
E. g. Mia,a esa huv-ge tase-ge bonde,

2 1 5 3 4
These girls will go to dance and to sing.

THE IMPERATIVE MOOD

is formed by the addition of the particle a, or na, to the verbal root. As in commanding, it is obvious, it is only the second person that is addressed, this mood may be said to exist only in that person.

Nyo bona, *Go thou!* Be-an-a, *Be silent!*

Nyo tap-pa dwe-na, *Lift up your spear!*

Prohibition

is implied by the addition of gá to the root.

Oku-ga, *Do not steal*; Se-ga, *Do not kill*.

Nyo na-pho khomiode-ga, *Do not be angry with your brother.*

Simple Negation

is commonly expressed by the word yem, or yom, appended to the root of the verb. Mta mara yom, *He does not laugh.* Mta, nyō abba no-yem, *He does not wish to strike you.*

But in the future tense, negation is implied by the word Lum. Ha-che-lum, *I shall not take it.* So lung ma-chu nye-chi hong-lum, *To-morrow the cow will give no milk.*

POTENTIAL MOOD.

When power or capacity is to be expressed, the word Hanende is added to the root of the verb.

Atya han-ende, *I can speak.*

Mta bo han-ende, *He can go.*

In the *Negative* form, Hane lum is substituted.

Atya hane lum, *I cannot speak.*

Mta Khre muba hane lum, *He cannot work, or has not the power to work.*

Particles.

Adverbs sometimes precede and sometimes follow the verbs they serve to qualify. Chy amte, *Quickly*; Chy amte chuna, *Run quickly*; Beh-e, *slowly*; Beh-e chia, *Walk slowly*; Beh-mte, *Quietly*; Beh-mte chona, *Put it down quietly*; Cha lung, *To-day*; Beling, *Yesterday*; So-hing, *To-morrow*; Mja Kanong? *Why?* Hno? *Where?* Kadego? *When?* Omam, *Yes*; Sam, *No*.

The *Prepositions* of occidental languages are, in this, rendered by post positive particles. For example :

Kwain : máye pya an kwá á,

1 2 3 4 5
The eggs are in the nest.

Do with : mta togo do nokwe chende,

1 2 3 4 5
He will kill the dog with the da.

Tomno with : Nya tomno sa naha ?

1 2 3 4
Who has come with you ?

Tappe from : Kreko tap pe ke ku chenema,

4 3 2 1
Bring the rice from the basket.

1 2 3 4
E tappe machi Kade-gadyá,

4 3 2 1
How far is the river from this?

In ordinary conversation these particles are frequently omitted, where the sense can be ascertained without them.

1 2 3 3 2 1
Haban ta mya á? Is there a tiger in the jungle?

Eya, Ridega, There is. Fear not.

Tamya elapi ha onde, If there is a tiger I shall shoot him.

Nyo mpo tawan thui aha? Are your arrows poisoned? or literally, Have you any poison in your quiver of arrows?

THE LANGUAGE OF THE MI JHU MI-SHMIS.

Of Nouns.

Gender.—This language possesses a variety of substantive terms, sufficient to denote all that is needful in the distinction of sex among human beings. Thus :

Ktchong, *Man*; Kmai, *Woman*.

Kepai, *Father*; Mum, *Mother*.

Sha, *Son*; Kmai sha, *Daughter*.

Tchep-mai, *Brother*; Ke-tchep mai, *Sister*.

Kesa, *Boy*; Mai-sa, *Girl*.

In the case of the inferior animals, the difference of gender is denoted by the terms Nga-long, *male*, and Kmai, *female*, appended to the noun Egj.

Masculine.

Manyong, *an elephant*; Manyong nga long,

Toppu, *a tiger*; Toppu nga long,

Kampai, *a goat*; Kampai nga long,

Leh, *a hog*; Leh nga long,

Feminine.

Manyong Kmai.

Toppu Kmai.

Kampai Kmai.

Leh Kmai.

The only exception to this rule occurs, as we have noticed also in the language of the Taying Mishmis, in the case of the domestic fowl Kai. *Male*, Kai apai. *Female*, Kai Kmai.

Number.—The noun admits of no plural form, in those instances in which the noun does not express a collective or a plural idea, a numeral added to it renders the expression sufficiently intelligible.

Ngang, a goose; Ngang ngun, eight geese.

Klan, a flower; Klan Kaplak, all the flowers.

Case.—There are no inflections in the language used for representing the various relations of nouns usually termed cases.

The expression of the Genitive case depends only on the juxtaposition of the two substantives, of which the former is understood to be in the Genitive.

Wa lap, The leaf of the bamboo.

Sabu yop, The child's hand.

The other cases are marked by the use of post positive particles.

Of Adjectives.

An adjective generally follows a substantive; as Manchu Ka-im, *a black cow*; K ang ga K hrang, *a long horn*.

There are no terminations to mark the degrees of comparison. But as the comparison of one person or thing with another so as to ascertain the relative quality possessed by each, must necessarily exist in some form in every language, we find that the general mode of forming comparisons in this, is merely by placing the adjective after the noun with which the comparison is made; Ke an Ktchong Kashyung, *I am leaner than this man*; or literally, *I this man lean.*

1 2 3 4 1 4 3 2

We no umong Kam, *He has more (than) you.*

Kadun, *much* or *very* is often added to an adjective to express a quality as existing in the highest degree.

Si Kamcheng Kadun, *The water is very cold.*

Numerals.

The following is the cardinal series of numerals adopted by the Mi jhu Mishmis.

- | | |
|------------|------------|
| 1. Kmo. | 6. Katham. |
| 2. Kaning. | 7. Nun. |
| 3. Kacham. | 8. Ngun. |
| 4. Kambum. | 9. Nyet. |
| 5. Kalei. | 10. Kyep. |

Kyep ma Kmo, 10 and 1.

Kyep ma Kaning, 10 and 2.

Kyep ma Kacham, 10 and 3, &c.

- | | |
|------------|----------------|
| 20. Ketag. | 30. Sung gyep. |
| 40. Brisi. | 50. Ngrunsi. |
| 100. Waye. | 1000. Kannu. |

There are no ordinals in the language.

Of Pronouns.

Gender has no place in the personal pronouns of this language, nor do they undergo any variations indicative of Case. As far as they are used as substantives, they admit of the addition of post-positive particles as in the case of nouns. As pronouns in ordinary discourse are frequently introduced without that connexion which could enable the hearer instantaneously to decide, whether one or many were intended, a mode has here been adopted to determine this independently of the connexion, and in consequence, the people make use of the termination Thal to express the plural number.

The personal pronouns are—

<i>Singular.</i>	<i>Plural.</i>
1st. Ke, <i>I</i> .	Kethal, <i>We</i> .
2nd. No, <i>Thou</i> .	Nothal or Nonethal, <i>Ye</i> .
3rd. We, <i>He or she</i> .	We thal or Vethal, <i>They</i> .

The demonstrative pronouns are, An, *This* and Phehai, *That*.

The interrogative pronouns are, Hoina, *Who?* Asan manai, *Which?* and Sindoi, *What?*

I am not aware of the existence of any relative pronouns in the language. This deficiency is supplied in the same manner as in the language spoken by the Taying Mishmis.

Of Verbs.

The moods and tenses of verbs are expressed by means of particles or significant words appended to the verbal root; but number and person are distinguished by no modifications.

INDICATIVE MOOD.

Present.

The verb in its simple state is often used as the form of the present tense, e. g.

Ke ndat, *I call*; No gap, *Thou fightest*; We gya, *He runs*.

To express a more definite signification, the word Meng is added as an auxiliary; thus,

Ke ndat meng, *I am calling*; No gyā meng, *Thou art running*;
We gap meng, *He is fighting*.

Past time is denoted by the addition of the particles Ga for the Imperfect, and Kong for the Perfect Tense.

Ke ndat ga, *I did call*; Ke gap ga, *I did fight*; Ke gyā ga, *I did run*.

We ndat Kong, *He has called*; Gap kong, *Has faught*; Gyā kong, *Has run*.

Future. Iung added to the verb denotes future time.

Ke ndat iung, *I shall call*; We gap iung, *He will fight*; No gyā iung, *Thou wilt run*.

There is no particular form to mark the Gerund, but in all ordinary cases, it is the verb in its simple state followed by another verb. Thus; Vethal tamy in vitch sup-kong, *They have purchased the salt to sell it, or for the purpose of selling it*.

THE IMPERATIVE Mood

which exists only in the 2nd person is indicated by the addition of Chu to the verbal root.

Khai chu, *Speak!* Groin chu, *Lift it up!*

1 2 3 4 5 6
Kesa maisa kaplak mai jai thai-chu,

3 1 2 6 4 5
All you boys and girls go and dance and sing.

Prohibition is expressed by prefixing Áí to the root; thus, Áí khai, *Do not speak*; Áí ngái, *Do not weep*; Áí mui, *Do not sleep*.

Simple Negation is expressed by prefixing Má to the root. Thus; We má lap, *He does not sit*; Kwe má chak iung, *The dog will not bite*.

POTENTIAL Mood.

Power or capacity is usually expressed by Non-niu added to the verb. We rung brü non-niu, *He can break the boat*; No jai non-niu, *You can sing*.

In the *Negative* form Má is prefixed. Ke mai má non-níu, *I can-not dance*.

Particles.

When a question is asked, the interrogative particle I is commonly used, except when any other word in the sentence implies an interrogation.

Wa jai-meng, tyat ma i? *The birds are singing, do you not hear them?*

No chi swí i? *Are you afraid of a mouse?* An na bang? *Whose cloth (is) this?* Ke gang na la kong? *Who has taken my bow?*

Adverbs generally precede the verbs they serve to qualify.

To nit, *To-day*; Mangane, *Yesterday*; Terung, *To-morrow*. Nanchang, *Slowly*; Ukai *Quickly*; Layim, *Yes*. Mka, *No*; Yahetai, *Where?* Chendo, *Siga*, *Why?*

The particles that take the place of Prepositions in this language usually follow the nouns they govern.

Sentences.

An thong ho, *Come and see this.*

Chohun miro sal chu, *Bring Chohun with (you).*

An tang klau na phi-kong? *Who has given you this spear?*

Heram vitch-kong, *Heram sold it.*

Mangane techim kino chat-ga, *Yesterday I killed a wild hog.*

Ti kong ti thong-chu, *Fetch some water from the water ghaut.*

Bli la ho i? *Will you come into the house?*

Nkhar li ktchong ma chak, *yahctái thai-kong,*

There are no men in the village, where have they gone?

Kom chat thai-kong, *They have gone to kill a bear.*

Tonit an nga Tam thongga, *Tam brought this fish to-day.*

VOCABULARY.

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi.</i>
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Air	Hzung	Mbaong.
All	Su-mive	Ka-plak.
Anger	Khomí	Sot-do.
Ant	Pa-swi	Cha kri.
Arrow	Mpo	Lo wát.
Ashes	Mgó	Da-moung.
Ask	Hahona	Wyet-chu.

Aunt, *Pat.*

„ *Mat.*

<i>English.</i>	<i>Tu-ying Mishmi.</i>	<i>Mijhu Mishmi.</i>
Back	Mpling	Glok.
Bad	Prám	Mphan.
Bag	Kapleh	Tapái.
Bamboo	Hweí	Wa.
Basket	Ka-le	Hó.
Beads	Ari	Krón.
Bear (n.)	Tahum	Kom.
Beard	Thrung-mung	Ha-mou.
Beat	Ab-bana	Phong chu.
Bead	Ipo-áng	Má.
Bee	Ta bi-ye	Sing glak.
Beg	Tha chi na	Gajai ja mong.
Belly	KLita pum	Ndak.
Betlenut	Gowe	Tarsi-chyet.
Bird	Mpía	Wá.
Bite	Thug-na	Chak-Chu.
Bitter	Ká	Hám.
Black	Ma-kwa	Ká im.
Blood	Rhwei	Vi.
Boat	Ro-wang	Rung.
Body	Mtho	Chai.
Bone	Lu bung Lubra	Zak.
Bow (n.)	Arri Kan	Gang.
Brass	Kha chi	Ta-nai.
Break	Hjo-na	Bru-chu.
Broad	Ii ež	Pat-ge-thai.
Brother (<i>elder</i>)	Na-fo	Tchepmai.
Brother (<i>younger</i>)	Pamyo	Gotwoi.
Buffaloe	Ma-ji	Tal-loi.
Burn	Pwe-na	Ru-nga-chu.
Bury	Mung-chona	Kam-tha-chu.
Call	Ame-na	Ndat-chu.
Cat	Majari	Jámi.
Catch	Ro-na	Choung-chu
Check	Tyiopo	Mlrup.
Child	Agemung	Sa-bú.

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi.</i>
Chin	Thano	Maha.
Cloth	Ka-jem	Bang.
Cloud	Anying	Ne-ou.
Cold	The-a	Kan-cheng.
Come	Honna-na	Hoi-chu.
Cook (v.)	Hi-a-na	Tehyot-chu.
Copper	Proi	Khyok.
Cow	Ma-chu	Man-chu.
Crooked	Gawe-ya	Kai-ku-kaiko.
Crow (n.)	Chak-lá	Wa-ha.
Cry	Khro-na	Ngai-chu.
Cut	Te-na	Njang chu.
Dance	Bui-na	Mai-chu.
Darkness	Kano	Báng-lá.
Daughter	Ayia	Kmai-Shá.
Day	Ki-hing	Songla.
Deaf	Nkru-na-Káppá	Ing-kom-bong.
Deep	Rum-ma	Gatháng.
Die	Siyoge	Ka-si-le.
Dig	Thuna	Leh-chu.
Dog	Nkoe-Nokwe	Kwe.
Drink	Chumma	Thang-chu.
Dry (adj.)	Soi-ya	Ge-sar.
Duck	Tkhréng-bu	Kai-pet.
Ear	Nkru-ná	Ing.
Earth	Thli	Nyai.
East	Te thi-yang	Lóng.
Egg	Máye	Chet.
Elbow	La-Ku	Rok-slong.
Elephant	Amieng	Mányong.
Eye	Mollom	Mih.
Face	Mi-nya	Ringa.
Fall	Ga-lya-na	Du-chu.
Far	Dyáu	Klam.
Fat	Dong-ya	Ka-shyot.
Father	Na-bá	Ke-pai.

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi.</i>
Fear (v.)	Ri-de-na	Sui-mang.
Feathers	Mung	Bú.
Fight	Toe-na	Gap-chu.
Finger	A-twi	Yop-dom.
Fire	Na-ming	Mai.
Fish	Tan	Nga.
Flower	Tappul	Klau.
Foot	Mgrung	Mplá.
Forest	Ha-bo-an	Kanan.
Forget	Wemsaya	Lamatko.
Frog	Ta-pwa	Nkhang.
Fruit	Chi	Chep.
Get	Tingyá	Than-chu.
Girl	Miú-á	Mai-sa.
Give	Hong-na	Phi-chu.
Go	Bona	Phai-chu.
God	Nging-ya (?)	Se-lap.
Goat	Ma-bie	Kam-pai.
Gold	Paddei	Som.
Good	Pra	Ga-chit.
Goose	Tkhrong-chi	Ngáng.
Grass	Ta-re	Roh.
Great	Drung	Ka-tái.
Hair	Thong	Chám.
Hand	Htyoa	Yop.
Hard	Tal-li-ya	Kong-mang.
Hate	Ka-pú-de-na	Ga-chok-chu.
Have	An	Kám.
He	Mta	We.
Head	Mkau	Kou
Hear	Pha-rong-na	Tyat-chu.
Hill	Thiá-Maia	Neng-tau.
Hog	Báli.	{ Leh (<i>domestic.</i>) Techim (<i>wild.</i>)
Horn	Ru	Kang.
Horse	Grue	Kom-beng.

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi.</i>
Hot	Tia	Kyem.
House	Ong	Bli.
Husband	Ha-mawa	Ke-ro-wai.
I	Ha	Ke.
In	Kwa	Li-Lá.
Iron	Tsi	Teng-gri.
Ivory	Ta-meng-lang	Men-yong-chí.
Kill	Se-kwon-de	Chat-mi-chu
Kiss (v.)	Do-ná	Yup-chu.
Knife	Nhwa	Soit.
Knee	Fa-bung	Pat-pau
Know	Kasai-a	Kong-nyet.
Laugh	Mara-a	Krep-chu.
Little	Go-chwá	Metham.
Light (n.)	Soná	Songla.
Lightning	Ablú	Mphra.
Look	Katho-na	Thong-cha.
Long	Kalong	Gakhrang.
Mad	Kappa	Karua.
Man	Nme	Ktchong.
Many	Ndü	Kadnu.
Mat	Tahrü	Sin.
Medicine	Ta-ma	Ta-si.
Milk	Nye-chi	Chynn.
Monkey	Tamium	Muh.
Moon	Hlo	Lai.
Mother	Ná-má	Nu-nu.
Mouth	Ku-kwen	Njyut.
Name	Ámung	Lámong.
Near	Mgáh	Aliroh.
Neck	Pa-húng	Hóng.
Nest	Pya-an	Wa-sa.
New	Moye	Gotan.
Night	Ya-bo	Búnglá.
No!	Sam	Mka.
Noise	Tyakwo	Lót.

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi.</i>
North	Ha-piye	Kampeyn.
Nose	Hnyá-gom	Min-yong.
Oil	Tou-chi	Na-man.
Old	Me	Gothung.
Open	Kana	Yat-chu.
Paddy	Ke	Hál.
Place (v.)	Cho-na	Tha-chu.
Plant (v.)	Lena	Lap-chu
Plough	Sipla	Thai
Pull	Mago-na	Gang-chu.
Push	Nyung Hlia-na	Lat-chu.
Quarrel	Khogahá-na	Maha-chu.
Quickly	Chyamte	Ukai.
Quietly	Beh-mte	Nachangui.
Rain	Kara	Ruwang.
Raise	Dwe-na	Gro-in-chu.
Rat	Ka-chi	Chi.
Ratan	Lakká	Lamaí.
Rice (<i>cooked</i>)	Tapoye	Set.
,, <i>uncooked</i>	Ke-kou	Ha-ku.
Ripe	A-hungya	Kasum.
Rise	Dwena-na	Long-chu.
River	Ma-chi	Ti-taem.
Road	Alyim	Blo-ong.
Run	Chu-na	Gya-chu.
Salt	Plá	Ta-myin.
Sand	Tappi	Ka-chen.
See	Ka-tho-na	Thong-chu.
Seek	Mla-na	Hong-chu.
Sell	Teo-na	Vitch-chu.
Short	Ka-tyoa	Ga-thi.
Shut	Ta-kwe-na	To-kwe-chu.
Silver	Pau-eng	Rupái.
Sing	Ta-se-na	Jai-chu.
Sister (<i>elder</i>)	Na-bi	
,, <i>younger</i>	Ma-thic	

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi.</i>
Set	Dena	Lap-chu.
Skin	Kwa	Wong.
Sleep	I-na	Mui-chu.
Slowly	Beh-e	Nachang.
Small	Che-ka	Karusa
Smoke (n.)	Naming-khu	Mai-hut.
Snake	Ta-bu	Zhú.
Son	Aye-wa	Sha.
Soul	Ta-we	Hang Mehim.
Sour	Hru-wa	Churr.
South	Ha-chua	Kam-dong.
Speak	Atya-na	Khai-chu.
Stand	Dwe-na	Long-chu.
Star	Ká-ding	Maji.
Steal	Oku-na	Rohu-chu.
Stone	Mphlá	Laung.
Stop	Kalyo-na	Long-chu.
Strong	P-eú	Kam-blau.
Sun	Ring-Nging	Lemik.
Sword	Togo-Sambe	Sambe
Spear	Tappa	Tang-Klau.
Sky	Ning	Tep-chyok.
Take	Che-na	La-chu,
Thunder	Búrra	Tomok.
Tobacco	Dhuá	Yamum.
Tooth	Lan	Tsi.
Tree	Machom	Chang-to.
Village	Má-tyung	Nkha-yeng.
Uncle (<i>pat.</i>)	Nada	Ua-pong.
, , <i>mat.</i>	Na-ku	Ke-yup.
Want	No-a	To-en-chu.
War	Mre	Et.
Water	Má-chi	Ti.
West	Holla	Sam.
White	Leowa	Kam-phlong.
Wife	Hamya	Ke-kmai.

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi.</i>
Wind (n.)	Hzung	Mbá-ong.
Woman	Miá	Kmái.
Wood	Barong	Sang.
Work (v.)	Khree-mu-ba-na	Se-nam-ha chu.
Year	Ka-nung	Laoma.
Yes	Omam	La-yim.
Young	Msa-bre	Yong-sa.

Notes on ancient Inscriptions from the Chusan Archipelago and the Hazara Country.—By Bábu RÁJENDRALÁL MITRA, Librarian, Asiatic Society.

The accompanying plate (XV.) contains facsimiles of three inscriptions lately submitted to the Asiatic Society. The first two are from Putu in the Chusan Archipelago and are interesting as affording traces of Buddhism in the remote isles of the China Sea. Mr. Townsend Harris of the American Consulat at Ningpo, to whom I am indebted for an opportunity of examining facsimiles of these records, informs me that the island, whence they are brought, is covered with the remains of monasteries, temples and hermitages, and held in great veneration by the Chinese. As a place of pilgrimage its reputation was at one time sufficient to attract the presence of the Emperor Kanghi to its shores, and even to this day, no females are allowed to land on it, lest they should defile it by their presence. The inscriptions were found recorded on granite tablets on the road side, about two hundred yards apart from each other.

The substance of the first inscription (Plate XV. No. 1) is the well known Buddhist formulary "Om Manipadmé hum," written in Sanskrita and Chinese characters. The second (No. 2) includes the same formula along with two other invocations, with the heading "tryam" triplet. The Sanskrita characters of both are of the 7th century of the Christian era, and bear a strong likeness to the modern Tibetan. There seems, however, to be a slight difference in the style and cut of the letters which induces me to think the first inscription to be somewhat older than the second.

The words of the triplet are :

Om Aripachani hrīh.

Nº 1

ॐ महेश्वरं

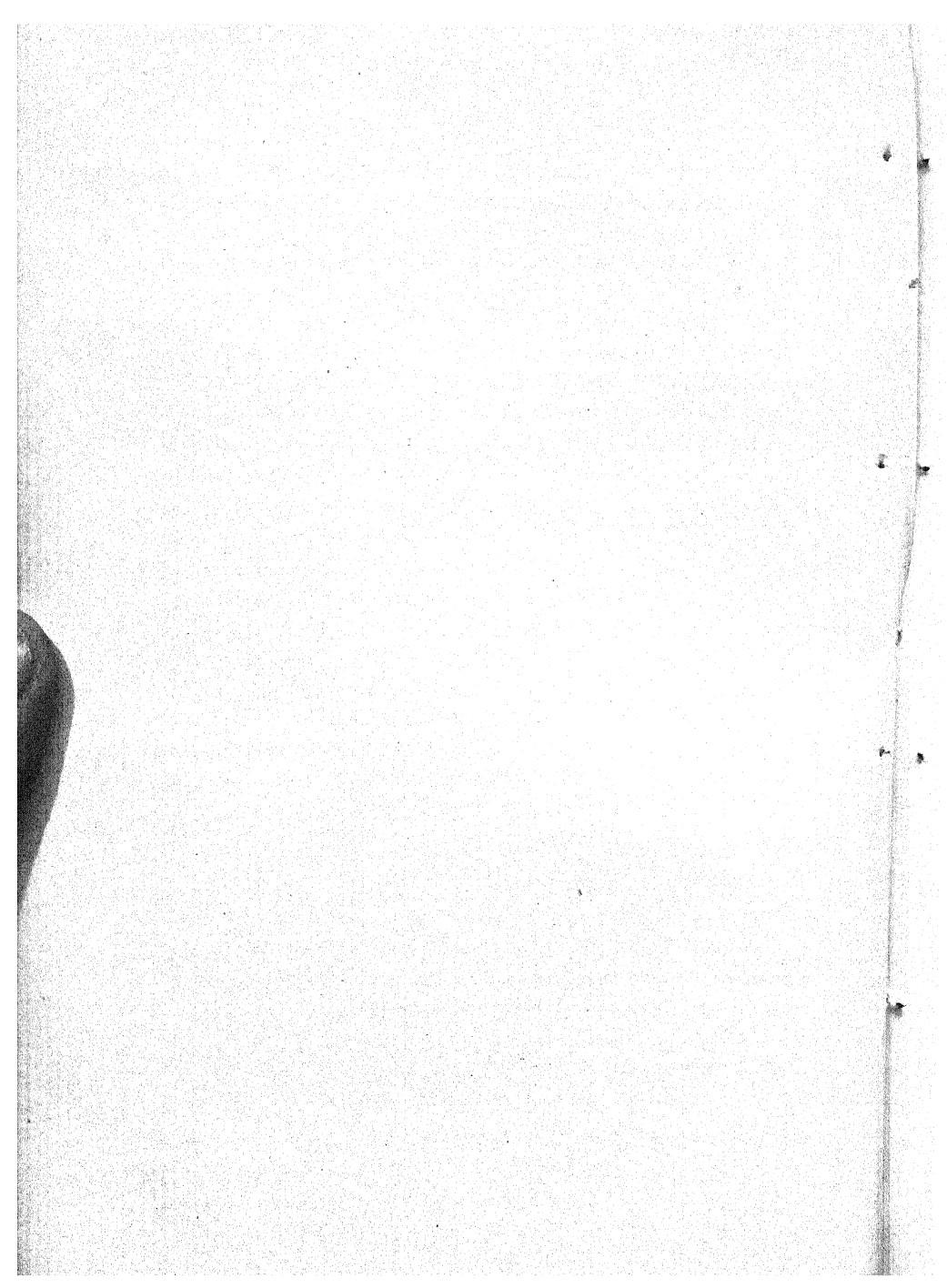
佛陀彌阿無南

Nº 2

ॐ अग्निपते तत्त्वं
 ॐ महेश्वरं
 ॐ रुद्रं

Nº 3.

त्वं त्वं त्वं त्वं त्वं त्वं त्वं त्वं



Om Manipadmé hum.

Om Vajrapáni* hriñh.

The first line is apparently the Vija-mantra or formula sacred to a Bodhisattva of the name of Aripachani, the second, according to Mr. Hodgson, is the Vija-mantra "of Padmapáni the *præsens divus* of the theistic school of the Buddhists," and the third of Vajrapáni, the third celestial Bodhisattva and lord ascendent of the last preceding age.

The most peculiar characters of the formulæ are the syllables ह्रीः: *hrih*, हूः *hum*, and ह्रीः: *hriñh*, but of their meaning nothing satisfactory can be made out with the aid of the Sanskrita Dictionary or Grammar: they are evidently mystic emblems and perfectly independant of all lexicons.

Georgi in the Alphabetum Tibetanum, M. Klaproth in the Journal Asiatique, and Professor Mill and Mr. Hodgson in the pages of this Journal have discussed at great length the import of the first inscription, and the first three are of opinion that the particle *hum* is equivalent to the Sanskrita *tathástu* and the English Amen. This opinion is supported by the author of the *Mediní* who explains *hum* with the word *abhyanujná* "assent," or "permission," and there can be no question that that is the true meaning of the word when used in common composition; in connexion with *vijamantras*, however, we venture to think the meaning is different. The particle in the second inscription is in the same position with the words *hrih* and *hriñh* and appears to be almost convertible, and yet the latter have as yet found no place assigned to them in any Sanskrita dictionary. In the *Kriyá-saṅgraha*, seventeen† different particles are used to convey

* The penultimate letter appears more like या *pya* or स्या *sya* than पा *pá*, and the name may possibly be Bajrasattva, but the last letter being distinctly a न *na*, I think the inscription has received some scratch under the letter in question, and that it is a पा.

† उँ वचसत्त्व-हृं उँ रत्नवच्च-त्रां उँ धर्मवच्च-क्रीः उँ कर्मवच्च-अः
उँ वचराज-जः उँ वचराग-हा: उँ वचसाधु-सः उँ वचरत्न- हृं
उँ वचतेज-चाः उँ वचयक्ष-हृं उँ वचहास-हां उँ वचधर्म-क्रीः
उँ वचतीक्ष्ण-धं उँ वचहेतु-मं उँ वचभास-रं उँ वचकर्म-कं उँ
वचसन्धि-वं

the same idea in connexion with the name of Vajrapáni which *hum* does with reference to Padmapáni in the inscription before us. The word is sometimes used by itself, as in the *Durgati Sodhana Avadána*, where the repetition of the mystic *hum* four times is said to be a preventive of all evils.* But it is in the *Vijachintámani* where we find the most conclusive proof of these terms being symbolic of some divinity, and in no way amenable to the rules of philological construction. The 4th section of that work states† that *h* is a representative of the sky, *m* of Síva, *u* of Sakti and the semilunate nasal mark *nádabindu* of the dispenser of salvation, and these letters together constitute the emblem *hum*. *Hriñh*, according to that authority, is emblematic of Síva, Vishnu, the presiding deity of the crown of the head, the Yoni, and the dispenser of Moksha.‡ *Ghain*, *Srim* and a host of other particles are explained in a similiar way.

Nor is this mode of typification opposed to the practice of the Hindus. The idea of using a literal symbol to designate the Deity's self, first originated with the Bráhmans, and the most ancient term of its kind is no doubt the Vedic Om. It is the great instrument of Bráhminic devotion, and may be assumed to be the archetype of all the symbolical terms used by the people of India whether Bráhminists or Buddhists. Sákya Siñha early imported it into Buddhism and his followers have ever since used it to indicate the Supreme Adi Buddha or whoever may be the prime source of all intelligence.§ The Jains not only adopted it, but coined a new term *Em* to devote the female

* शुक्तस्तुभिर्द्वंङ्गारैः प्रयुक्तः सर्वकर्मचु । कुलचयेषु सामान्यः त्रोधो ह्यन्तकु-
ण्डलौ । सर्वविद्विवाशाय गुद्धाक्षिप्रभाषितः । *Durgati Sodhana Avadána*.
Asiatic Society's MS. No. 817, folio 15, p. 1, line 12.

† सर्वविद्विहरं देवि इकारं योमसञ्जकम् । सर्वपापहरं देवि सकारं शिवरूप-
कम् । जकारं परमेशानि शक्तिरूपा शनातनी । महासोक्षप्रदं देवि नादविन्दुं
सुदुर्लभम् ॥ छं ॥ *Vija-chintámani*, 4th patala.

O Devi the letter ए (h) called Vyoma or the sky, destroys all evils, and the letter म (m), which is a manifestation of Siva, purifies all sins; the ऊ (ú) is the embodiment of Sakti called *Sanátaní*, and the ऽ (cerebral nasal mark), O Devi, is the dispenser of Moksha.

‡ शिवरूपं इकारं रेफो विष्णुर्णे संशयः । इकारं मूढिनो साक्षात् योनि-
षेदः सुरेच्छरि । नादविन्दुं महेशानि साक्षात्तोक्षप्रदायकम् । ह्रो । *Ibid.*

§ Mémoires concernant l'Histoire, &c. des Chinois, V. p. 59.

energy or efficient cause of the Universe, Om being, according to them, a representative of the Omniscient as quiescent and unconnected with the world.

Among Buddhists, following the well known law of phonology whence arises the cockneyism of aspirating initial vowels, Om, we imagine, readily passed into *Hum*, and when the seed for multiplying mystic symbols was once thus thrown on a soil so pre-eminently favourable to the development of fancy as is supplied by the Indian mind, not only did the original emblem of the Deity undergo the most phantastic transformations, but the whole of the Sanskrita alphabet* was put into requisition to supply materials for esoteric symbols of divinity. The Bráhman followed in the wake of the Buddhist, and no ordinary care was taken to assign these new terms to appropriate deities and invest them with the most extraordinary attributes. The greater portion of the *Gyut* or the last division of the *Kahgyur* is devoted to this object, and the Tantras of the Bráhmans are replete with the most varied forms of Mantras. In some instances these symbols are extended to most unwieldy proportions. The Vijamantra of Syámá, a form of Durga, according to the *Mahánirván Tantra*, is “Kriñ kriñ kriñ hám hám hriñ hriñ Dakshine Kálíké kriñ kriñ kriñ huñ huñ hriñ hriñ swahá” [क्रौं क्रौं क्रौं हँ हँ हौं हौं इच्छे कालिके क्रौं क्रौं क्रौं हँ हँ हौं हौं खाहा] ; that of Bhadra Káli is, “Haum Kali, Mahákali, kili kili phat swáhá” [हौं कालि महाकालि किलिकिलि फट् खाहा] ; that of Kátýáyaní “Aim hrim srim chaum chandikáyai namah,” [ऐं ह्रौं चौं चौं चण्डिकायै नमः] ; that of Narahari “Am hrim khaum hum phat” [आं ह्रौं चौं हँ फट्] that of Tvaritá, “Om hrim hum khe cha chhé kha stri hum kshe hrim phat” [ओं ह्रौं हँ खे च हे च ली ह्रौं चे ह्रौं फट्] :

* अकारादिचकारान्ना साट्का वौजहपिणी ।

विसर्गस्त्रैव विन्दुस्त्र चिविन्दुब्रह्मविग्रहः ॥

वर्षानु जायते ब्रह्मा तथा विष्णुः प्रजायते ।

रुद्रस्त्र जायते देवि जगत्संचारकारकः ॥

The letters अ to च of the alphabet are mystic emblems (*Vija*) ; the *visarga*, the *vindu*, and the *tribindu* are manifestations of Brahma and Vishnu : from them, O goddess, proceeds Rudra the destroyer of the world; from them proceedeth Brahmá. *Vijachintámani*, I. Patala,

From an attentive examination of these and such like mantras and the religious terminology of the Bráhmans to which the Buddhists are very largely indebted, it appears that the phonetic particles which constitute the peculiar characteristic of mantras are crude terms, coined to indicate the essence of the divinities to whom they are assigned and to stand as their representatives. They are formed generally, though not invariably, by the addition of the *anuswar* or the *visarga* or both to single or compound consonants, and are used either singly instead of the name of the gods or goddesses to whom they are sacred, or in connexion with their names as compound terms, without being subjected to any grammatical regimen. When inflections are used the names are put in the nominative, the accusative, the locative or the vocative case, the meaning being in the three former cases that the emblem stands for or exists in the divinity of that name, and in the latter a mere interjection. The use of the locative, however, is confined among the Buddhists. In mantras adapted for the destruction of enemies, or for the neutralization of poisons,—the name of the god to whom they are addressed is generally put in the nominative case; but this construction is confined to the mantras of the minor divinities.

According to the above deduction the three formulae of the inscription may be explained as follows:—

- 1st. Om the deity is in Arapacháni who (or whose emblem) is hrih.
- 2nd. Om the deity is in Manipadma who (or whose emblem) is in hum.

3rd. Om the deity is Vajrapáni who (or whose emblem) is hríñh.

Both the Buddhists and the Brahmins regard their *vija mantras* with the greatest veneration as the most sacred emblem of the Deity, but while the former, actuated by the exclusive spirit of their religion, hold out the most dreadful imprecations against him, who should venture to repeat a *vija mantra* in the presence of a fellow-man, the latter proclaim it every where and at all places, alike on the road side and at the market place, as in the vihára and the closet, and in the same breath invite the most revered Lámá and the detested Chandála to avail themselves of its aid, and secure for their erring souls, immediate and eternal salvation.

No. 3 of Plate XV. is the facsimile of an inscription found by Capt. Pearse, of the Madras Cavalry, in a small mound in the village

of Shah Dhairi, on the high road from Rawal Pindi to Hazara. The record was originally inscribed on a narrow slip of copper $9\frac{1}{2}$ inches by $\frac{5}{8}$ ths of an inch, which has been, apparently by some accident, broken into four fragments; the characters are Arian and the language is Páli. I have seen a tentative reading of this by Mr. E. Thomas, of the Civil Service, in which occur the words “*Ayanachandra*,” “*viveka*” “*viphala*,” but have not as yet been able to make out its purport.

Account of a visit to the Shrine and town of Sakhí Sarwar in the Lower Deráját; with a notice of the annual Melá or Fair held there.—By Lieut. H. G. RAVERTY, 3rd Regt. Bombay, N. I. Asst. Commissioner, Múltán.

“ Friends of my heart, who share my sighs,
Go seek the turf where Kásim lies,
And woo the dewy clouds of spring,
To sweep it with prolific wing.

Within that cell, beneath that heap,
Friendship, and truth, and honour sleep,
Beneficence that used to clasp,
The world within her ample grasp.”—HASAN-AL-ASSADY.

In the month of April, 1853, whilst stationed in the Deráh Ghází Khán district, I took the opportunity of paying a visit to Sakhí Sarwar, a small town celebrated for its famous Shrine bearing this name—situated on the western skirt of the mountains, the continuation of the Súlímán range; and where an annual *Melá* or Fair is held, which is attended by several thousands of people.

The Fair commences from the first of *Bysákh*—the first month of the Hindú year, and continues during the two following days. On the year in question, it fell on the 9th, 10th, and 11th of April; and people—both Hindú and Mussulmán—with their families, were flocking to it from Sindh, Bháwalpúr, Jesalmír, and even as far east as Delhi, as well as from all parts of the Panjab.

They at first assemble in the town of Deráh Ghází Khán; and on the two last days of the month of *Chaitrr* they commence their journey. The first stage is by Chowrutta to Vidor or Widor, a distance of about eighteen miles, as far as which water is procurable. Here they

halt for the night, it being necessary that they should reach the end of their journey on or before the morning of the first of *Bysákh*.

On a reference to my notes, I find that I left Deráh Ghází Khán, accompanied by that fine old veteran Malláh Khán, a Resáldár of the Deráját Mounted Police, and two Sowars of the same corps, at 2 p. m. on the 9th April; and reached Chowrutta, a small village to the left of the road at half-past 3. The whole of the way from Deráh to this place, a distance of about nine miles, was one continuous string of camels with gaudy trappings, ponies, horses, and bullocks, besides crowds of foot-passengers, all hastening to the Fair.

“The roads were clad frae side to side
Wi’ monie a weary body,
In droves that day.”

There were men, women, and children; but by far the greater number—as usual on such occasions—were young women in *Kajáwahs* or litters on camel’s backs; and numbers of them were exceedingly pretty. All seemed in high spirits, and roguishly inclined, if we may judge from the sparkling glances of their dark eyes.

The same scene occurred as far as the village of Widor—another nine miles,—which is about half way, and where I arrived exceedingly thirsty at about 5 p. m. The water here is horrid, and is as black as ink; in fact the sight of it is almost enough to give one the plague. As I have said before, I was very thirsty, and there being no time to mince matters, I was obliged to take a dose, which I managed by holding my nose with my fingers, so as to at least get rid of the smell, if I could not of the flavour.

The people, that is to say the fair-going ones, halt here for the night, on account of there being no water between this and Sakhí Sarwar, a distance of about sixteen miles, with the exception of small quantities procurable from the Belúchís who station themselves along the road and dispose of it at about a half-penny per cup.

I had left the old Resáldár and one of the two Sowars (who were rather sparing of their horses) behind, between Chowrutta and Widor; so I set out from the latter place with one Police horseman, and four Belúchís of the Laghárí tribe, furnished by their chief—Jellal Khán—in whose district we then were. We passed through a bare and desert tract of country gradually approaching the hills

to the west, which are perfectly bare, and to all appearance different to any I had ever seen, inasmuch as they seemed, from their singular abruptness, to be almost inaccessible. About two miles distant from Widor we came upon stones and pebbles, and a peculiar clay which from its great hardness might be mistaken for stone. This is mere debris from the hills forming as it were a belt of some eight or ten miles in breadth that joins and runs parallel to the rich alluvial soil of the Indus, which on the right or western bank is about twenty miles broad on the average.

We now passed the remains of a well which that popular ruler—Dewán Sáwan Mall, Názim of Múltán—attempted to sink for the convenience of the visitors at the *Melá* or Fair, but without success, having found it impracticable after employing workmen on it for about a year. It now appears like the remains of a tank. Some four miles from the end of our journey, to the left of the road, there is a platform of stone and lime, built by one of the votaries of Sakhí Sarwar, round an aged tree. It is said that this tree remains in leaf for twelve years at a time, and for a similar period bare and blighted. The ninth year of its blight has passed, and in another three, *they say*, it will again put forth leaves. By all accounts, however, it appears that the tree has been dried up in this state for the last fifteen years or more. The trunk contains several iron nails or pegs, which have been driven in by deluded people having some wish to be fulfilled. It is usual to drive in a nail one year, and the year after, if the desired object has been acquired, to come and draw it out again. The Hindús have also plastered over the trunk with red lead in the same manner as they are in the habit of anointing their gods. When they reach the tree they make their prostrations to it calling out the name “*Laalí wallah*,”* not Sakhí Sarwar; for they say that four rubies are suspended over his tomb, but they are not visible to mortal eyes. They continue to cry out to the Saint by this name of *Laalí wallah*, and singing their hymns proceed towards his Shrine.

On leaving Widor, the sky away in the north-west was dark and over-cast, and threatened rain, which came on with violence, shortly after the sun set and attended with gusts of wind, and vivid flashes

* *Laalí wallah*—from لعل—a ruby, and والل—a master, possessor, etc.

of lightning. There was no remedy but to make for a small clump of trees, which fortunately happened to be within a short distance; and with the shelter afforded by the ample blanket of the Police horseman—A Kanker Aghán—who with myself in the middle and my four Belúch guides with our horses huddled together in a line—those on the right and left, holding the ends of the blanket, and each holding it over his own head—we managed to hold out for some time, until the blanket got wet through, when the storm luckily passed off; and we again went on at a brisk pace to make up for lost time, as night was fast approaching.

The road became more stony and more difficult as we advanced, from the streams of water and the increasing darkness, which was only at times relieved for a moment by a vivid flash of lightning, very often disclosing our dangerous proximity to a ravine or water-course. However we succeeded in reaching the end of our journey (Sakhí Sarwar at that time of night appearing a very strange looking place) without further accident at about half-past 7 o'clock; and I was heartily glad to get into my snug tent, where I found the tea things on the table, and the kettle singing for tea—

“ The very winds that sigh or roar—
 The leaves that rustle dry and sear—
 The waves that beat upon the shore—
 They all are music to your ear :
 It was of use
 To Orpheus—
 He charmed the fishes in the *say* ;
 So every thing
 Alive can sing—
 The kettle even sings for *tay!* ”

April 10th.—On getting up this morning and looking out, I find I was not deceived in the idea entertained last evening as to Sakhí Sarwar's being a strange-looking place. The town as it may be termed—a collection of flat-roofed mud houses about five hundred in number—is situated on a tongue of land to the left, near the entrance of the Dalánah Pass; and is surrounded by bare and rugged hills on all but the western side. The place just below the town to the north where the Fair is held is rather open. It is the dry bed of a mountain stream, which flows only in the winter

months after heavy rains in the hills ; and consists of sand and pebbles with numerous boulders. In the months of June, July, and August, this place must be a second Dádur ; and what with the scarcity, as well as the badness of the water, must be fearful indeed. There are a few Kunar, Gaz, and Arák trees in the bed of the river, but with this exception, all around is bare and stony.

That side of the Zéérat or Shrine, facing the bed of the river to the north, and that to the west, rise abruptly to a considerable height. These two sides are built up in the form of steps, seventeen in number, which are faced with lime and brick—the same materials as the buildings belonging to the Zéérat (described in a subsequent paragraph) are composed of. These steps answer the purpose of seats for the spectators at the Fair.

The Fair does not commence in real earnest until to-morrow, and from where my tent is pitched I cannot perceive many people. There are however no less than seven whirligigs in full operation ; and men and women—boys and girls, take their swing, and seem to enjoy it greatly. There are also several dancing bears and monkeys ; and the usual accompaniment of *tom-toms* and other Indian unharmonious musical instruments, whose din and discord seems “to charm the savage breast.” There used to be horse-races in former times ; but this amusement has declined of late years, and now is almost obsolete.

Some of the Belúchis here amuse themselves with a very strange and peculiar dance. About thirty or forty assemble together and arrange themselves in a circle, each man with two pieces of wood or two stones in his hand. Then placing the left foot forward they commence to move along in an oblique direction by placing one foot over the other. During the whole time one of the party—generally the one with the best voice—sings one of their rude songs of love and war, the others keeping time by striking these strange castanets together, and joining in chorus. Sometimes they turn round, at others they meet ; and having half bent their bodies place both hands over their heads. They then hiss at each other ; and having again formed the ring they proceed as before described.

This afternoon, attended by the Resáldár and a few Laghári horsemen, I went up the Dalañah Pass into the hills for about nine

miles. The road lies through the dry bed of the river which I have already referred to. It is filled with lime-stone boulders, and in many places is very narrow, particularly about three miles and a half from Sakhi Sarwar, where an immense portion of one of the hills to the right of the path fell down two or three years since, and completely blocked up the road. The second range of hills seem to be composed chiefly of limestone, running slantingly in a south-east direction towards the river; whilst the first or lowest range appeared to be entirely of sandstone. I also noticed in many places boulders of limestone mixed with sandstone, which appeared to be either in a decaying or hardening state. The whole of these hills are perfectly bare; and with the exception of a few patches of green at the foot of the hills through which our path lay, growing from the debris which had collected from above, not a blade of grass was to be seen. There were however a few dwarfish trees and shrubs peculiar to the country scattered about here and there. I went on as far I could conveniently go on horseback, until we reached a *Kotul* or Pass which from its steepness would have been dangerous to have attempted except on the horses of the country. I was now in ROH—the bugbear of the authorities, and the Alsatia of the Derajat—amongst mountains lofty and grand, some of which rise to a height of 1000 feet or more; but the scene wore a dreary, desolate, and gloomy appearance; for even the wild animals and birds appeared to have deserted it. The third or higher range, called the Koh-i-Siah or Black Mountains, was at a long distance from us, and appeared of immense height.

It is from the bed of this river or torrent, whose windings we have been following, that the whole of the water with which the town of Sakhi Sarwar is supplied—at this period no small quantity—is obtained. The wells, as they are termed, consist of a number of holes or pits dug in the sand, and are about forty in number. The water, which is of a blackish colour and brackish taste, is found at depths varying from ten to fifteen feet from the surface. The strata consists of sand and gravel mixed with pebbles varying in quantity as the depth is increased. During the period of the *Melá*, the attendants at the Shrine make a deal of money by the sale of water, which is purchased from them both by Hindús and Muham-

madans. They fill about a thousand skins besides numbers of earthen vessels beforehand. The price per skin-full the first day, is two annas or three pence English, which increases according to the supply.

Soon after my return this afternoon the sky again became overcast ; and towards sunset it came on to blow and soon after to rain, attended with thunder and vivid flashes of lightning, much in the same manner as the preceding evening ; and people were now seen running in all directions to the town to escape a ducking. This was most unfortunate, as the fashionable time for the pleasure-seekers appeared to be after 4 P.M., and until long past midnight ; but this unfriendly rain has completely damped the sport. The rain cleared off for a short time in the evening ; but about 10 o'clock it re-commenced, and continued with violence for the greater part of the night. Knowing the sandy nature of the soil too—for my tent was pitched in the dry bed of the torrent, as I have before noticed—I was momentarily expecting the tent-pegs to come up, when down would have come the whole machine, and probably half-smothered me in the ruins.

12th April.—This being a fine day and the last day of the *Melá* also, I availed myself of the opportunity of taking a couple of sketches of the scenery—one of the town and Shrine of Sakhí Sarwar, the other looking up the Dalánah Pass, already noticed. To the south of the town, the road leading into the Sakhí Sarwar Pass, which is one of the routes to Kándahár through Sewestán and the Pishín valley to Kelát viā Tull and Dádur, lies over a stony plain for about seven miles before the hills are reached.

It is said that some forty thousand people assemble on the last day of the *Melá*; but I imagine from what I saw this day, that one half the amount would be nearer the truth ; still, the number of persons who visit the place during the latter part of March and the beginning of April, cannot be far short of fifty thousand. There is no kind of trade carried on here, such as at what are generally termed Fairs, being altogether of a religious nature ; but I think that a commercial Fair might be opened at this time with very great advantage, and with every chance of success. It certainly would be a very favourable opportunity to try the experiment.

The town of Sakhi Sarwar contains about five hundred houses, and about 2,500 inhabitants, out of which number, the attendants at the Shrine, including young and old, amount to 1,650; and who, within the last thirty years, (according to their own account) have never been below or above this number. Each of them, whether "the infant, mewling and puking in the nurse's arms" or "second childishness and mere oblivion," each is entitled to an equal share of the offerings made by the visitors at the Shrine.

The Shrine itself is enclosed within a building with high walls about seventy paces in length and breadth, which is entered by a lofty gateway with minars from the south side. Three sides of the interior are open, but to the north there are two buildings opening one into the other. The eastern one, the pilgrims assemble in: the western apartment contains the tomb of Sakhi Sarwar, which is breast high and covered with a black pall. At the head is placed a green turban over which the visitors strew flowers. On this side, seated on the floor, is the *majawir* or attendant who receives the money, before whom are heaps of copper coins and cowrie shells, which have been thrown there by the humbler class of pilgrims. The larger sums, from a rupee upwards, are placed on the tomb itself. From the personage just referred to, each visitor receives a small string to fasten round the neck, which is made of black lamb's wool, and is considered a powerful charm by the simple-minded people. The Shrine-room is quite dark, and so exceedingly close from want of ventilation and from the oil of the lamps which are continually burning, as to be almost unbearable to any one but a native. The walls too from the smoke from the lamps have become quite black. The whole range of buildings is strongly built of brick and lime.

It is imperative on all pilgrims coming here, to sleep on the ground; and I imagine that such a thing as a *charpai* or bedstead will not be found in the whole place. The reason advanced is, that as the cold earth was the martyr's bed, so must it be the bed of his votaries also.

The town also contains about sixty shops, of whom ten are occupied by sellers of sundries, such as needles and thread, women's bracelets, drawer strings, and such like nick-nacks; six sweetmeat-sellers; and the remainder sellers of grain, flour, sugar and ghee,

There are no shoemakers or any other artisans, except a few tanners.

In the afternoon of the last day of the *Melá* the visitors begin to draw off, and by the next day the place is deserted. To avoid confusion I left a short time after two P. M., attended by the same party of Belúchís who had accompanied me from Widor, and one Police horseman who acted as my orderly. At half-past three o'clock, having again lost the Resáldár on the road, we reached the latter place—a distance of sixteen miles; and after devoting a quarter of an hour to breathe the animals, at the request of my Laghári guide, I exchanged the fine mare which had carried me so well thus far, for the one he had ridden, as I had the advantage of being a lighter weight, he taking the mare of another of the party whom we now left behind at Widor. By degrees the party—now consisting of five persons—began to diminish—at first one, and then another dropped behind—and by the time I had arrived within a mile of Deráh Ghází Khán, the Police Orderly Sawar alone remained with me. We reached Deráh at a quarter-past six, having come a distance of thirty-six miles in three hours and a quarter, the policeman's horse having carried him the whole of the way. The Belúch mare too had not done less, for she had carried her master one half, and myself the other half of the distance. Both animals could have gone much farther had it been necessary. This speaks well for the endurance of the horses of this part of the country—celebrated in the writings of classical authors as the land of the Aswádyas—the country rich in steeds.*

The following tradition respecting Súltán Sakhí Sarwar, I have extracted from the account of his life contained in a small book, the property of one of the attendants at the shrine, which was kindly lent to me for that purpose.

HISTORY OF SULTAN SAKHI SARWAR.

"The real name of Súltán Sakhí Sarwar was Suyed Ahmed, but he is best known amongst his disciples by the former name. His father was Suyed Zain-ul-Abadín, bin Suyed Omar, bin Suyed Abd-

* The Ossadíi also sent ambassadors tending allegiance. Who these different tribes were, it is not possible to ascertain; their names were apparently Indian. The Ossadíi may have been the people to the west of the Indus—the Aswádyas, the "rich in horses." Wilson; Ariana Antiqua, page 201.

ul-Latíf, bin Suyed Shaikah, bin Suyed Ismáæil, bin Suyed Imám Mousa Kázim, who was one of the twelve Imáms, and the sixth in relation from Alí the son-in-law of the prophet.

“ Zain-ul-Abadín—the father of Sakhí Sarwar—was one of the attendants at the tomb of the prophet at Madína. One night in a dream he saw the Prophet standing beside him, who gave directions that he should proceed direct to Hindústán,—the people of which country having lost their road to the true faith, were groping about in darkness—for the purpose of bringing them again into the right path. He accordingly set out for India; and after some time spent on the road, he at length reached the village of Sálkot which lies about fourteen or fifteen miles to the south of the city of Múltán. He first led back the people of this place to the path of orthodoxy; and after residing here for some time, Rehán Khán, Afghán, who entertained great respect and friendship for the Suyed and venerated him for his piety, gave him his daughter in marriage. By her he had two sons—one Suyed Ahmed, known as Súltán Sakhí Sarwar, and the other Suyed Dhodá. After some time he took the daughter of Suyed Abd-ul-Khálík as his second wife, and by her had three sons—Da’oud, Muhammad, and Sohárah. Zain-ul-Abadín at length died, and was buried at Sálkot, above referred to;* and Súltán

* From enquiries made since the above was written, I find that there is a small village near Kotlah Nijábát in the Pergannah of Múltán, at present known by the name of Sháh Kot, situated about fourteen miles south of the city. Its former name is said to have been *Seh Kot*, (Three Forts) and has been inhabited for the last hundred years; but the three Kots or Forts, from whence its name is derived, are now in ruins.

Near this village there is a place enclosed within four walls, in which there are three *Khánkas* (small domes or chapels) each of which contains a tomb. The first is that of Suyed Zain-ul-Abadín, who died about 670 H.—1271-2, A. D.; the second of his wife Bíbí Æyá; and the third of Suyed Máhmúd their son. In the month of Asarah (June) a *Melá* or fair, or more properly speaking, an assembly of the votaries of the defunct, is held here, and numerously attended.

Zain-ul-Abadín is said to have had four other sons—one Sakhí Sarwar who died about 690 H.—1291, A. D.; and whose tomb is situated at the village bearing his name, in the hills west of Deráh Ghází Khán; the second Híráh; the third Suyed Da’oud who died at Bokhárá; and the fourth Abd-ul-Ghanní who died at Ramak, a small district near Ghazní, inhabited by the Lohání Afgháns.

The tombs which are in a very dilapidated state, formerly bore inscriptions in Arabic; but they have long since become entirely defaced.

Sakhí Sarwar, who was remarkable for his piety succeeded to the religious honors of his parent.

"After some time, Súltán Sakhí became desirous of travelling and wandering about the world, as is the custom of such devout persons, in order that they may confer the benefit of their sanctity and piety on others. One day he was seated near the banks of a river (the Chínáb probably) when he saw a mare, very thin and weak from great age, grazing at a short distance from him. Perceiving the emaciated state of the animal he said unto her, 'Graze and become fat;' and by the favour of the Almighty, after a few days the old mare had improved so much in condition and appearance, as to be even preferable to a younger animal. After some time a water horse came out of the river and copulated with the mare, and from this connection she brought forth a *sammand*, or dun-coloured female colt. Subsequently a person of the neighbouring village happened to discover the mare in the jungle, not only exceedingly sleek and in good condition, but also with a fine colt at her side. On his return home he lost no time in mentioning the circumstance to the owners of the animal, two brothers by name Ahmed and Máhmúd, who also resided in the village. They were much astonished at what he told them, for the mare had become so very weak and thin from extreme old age, as to be useless to any one; and disbelieving what he had told them, they said the beast must have been devoured long before by the wolves and jackals. The man persisted that what he had said was true, and swore by the Prophet's beard to the truth of his statement. The brothers being now somewhat convinced went along with him, and found that the man's statement was perfectly correct; and they returned home, bringing the mare and foal along with them. The account of this remarkable occurrence spread far and near, and astonished every body.

"At length Súltán Sakhí himself expressed a wish to purchase the colt; and requested some of his disciples, of which he had now gained a great number, to mention the same to the owners, and say that he would give them whatever price they might ask for it. They went accordingly, and expressed the holy man's wishes to the brothers; but the unfortunate wretches would not consent to part with this foal under any terms. At length, however, calamity befel

the brothers—sickness and poverty overtook them—and setting this down to the effects of Súltán Sakhí's anger against them for refusing to part with the dun colt, they now came to him, at the same time bringing the animal; and requested he would forgive the past, for that the Almighty had brought all these misfortunes on them in consequence of the Suyed's anger. They were accordingly forgiven; and after having presented a *nazaránah* or present given to a superior, they became the Suyed's disciples.

"One day Súltán Sakhí mounted on his steed set out unaccompanied from the village, and went to a lonely and desolate place he had selected, where he fasted for a period of forty days. During this period the mare was tied up near by. At this time some people, who by chance happened to pass that way, saw a young man, whose forehead was illumined with the light of piety, and on whose countenance the stamp of sanctity and devotion was impressed, engaged in prayer; and a little on one side of him was a mare which had been secured with head and heel ropes. Now the three pegs to which these ropes had been fastened had taken root, and had shot up into young saplings. On reaching a hamlet which was not far off, they mentioned to the people there this remarkable circumstance, and they equally astonished, and filled with veneration, numbers of them became disciples of the holy man.

"On the termination of the forty days, Súltán Sakhí set out in company with his new proselytes, for the city of Múltán, which at this time was governed by a ruler known by the name of Ganno. The people of this Prince hearing of the arrival of the *Sarwar** with his followers, reported to their master that a Husainít had arrived there, accompanied by a dun steed which had such eyes as had never been seen in any animals before. The Prince on hearing this account determined to visit the holy man; and taking with him an Irákí horse, and a sum of money as an offering, he set out for the temporary residence of the Suyed. Having presented his *nazaránah* he expected to have obtained in return the dun mare, which indeed was the real object of his visit, and was going at length to demand it of Súltan Sakhí; but the tongue clave to the roof of his

* *Sarwar*,—a prince, sovereign, leader, lord, &c.

† *Husainí*,—the name of a sect, the followers of Husain the son of Alí.

mouth, and he could not utter a word. After some time however he recovered the faculty of speech ; but he took his leave without again attempting to make known his wishes.

" After the departure of the Prince the Saint's followers came to him and begged that he would give them the Iráki horse which God had thus bestowed on him, to do what they liked with. He resigned the animal to them ; and they took and slaughtered it, and cooked and ate up all its flesh. The enemies of the holy man who happened to hear of this, went and gave information to the Prince of Múltán, who forthwith sent and demanded back the Iráki steed and the money which he had given. The Suyed, who had become aware of the object of the Prince before the arrival of his messengers, now purified himself, and went out into a solitary place and commenced praying—" Oh God ! Oh Almighty Father ! thou hast the power to restore the dead to life, as well as to bring the living unto death ! make not this thy unworthy servant contemptible before the wicked and iniquitous !" The horse was forthwith restored to life ; and the heart of Sakhi Sarwar was moreover comforted by the words, ' Fear not,' which greeted his ears from an unseen and invisible speaker. The messengers from the Prince now arrived, and demanded back the Iráki horse together with the money. They were requested by the Saint to go to his disciples and demand them ; and to state at the same time that it was his wish they should be restored. When the Prince's people reached the dwelling of Sakhi's followers, to their great disappointment, they found the horse alive, on which they returned to their master ashamed and disgusted. The Prince himself no less displeased at his own conduct, went and begged for forgiveness. The Saint assured him that he entertained no enmity whatever towards any one ; and requested him to set his mind at rest in the matter. The Prince overcome by the forgiving disposition of Sakhi Sarwar, became his disciple forthwith ; and as a proof of his regard for him, he gave our Suyed his daughter—Bíbí Ba'ie—to wife. From this connection a son was born, who was named Rú'i-ud-Dín, better known as Mí'áh Ráná.

Súltán Sakhi Sarwar took up his residence at Múltán, intending to end his days there ; but there is no remedy for mortal man in this Vale of Tears without dying the death :—

“ Believe not Fate at thy command,
 Will grant a meed she never gave ;
 As soon the airy tower shall stand,
 That’s built upon a passing wave.” MUHAMMUD AL-TAHMANY.

“ A disturbance now broke out in the vicinity of Múltán; and it was currently reported that the Káfirs or Infidels inhabiting the mountains near the Indus—distant some sixty miles to the west—had assembled in great numbers, and had killed and plundered the property of the Faithful residing in that part of the country. This was soon after corroborated by a number of the injured parties appearing at Múltán to make known their wrongs to the powerful Muhammadan chiefs there; and demand their aid, and that of their brethren of the Faith in general, to enable them to take revenge on the Infidels. Súltán Sakhí Sarwar was one of the foremost to render the succour they sought; and he accordingly set out to oppose the Infidels, taking along with him his brother—Khán Dhadá, and Mí’áh Ráná—his son by his third wife, Bibí Bá’ie—who also accompanied her husband and son. Núr, Omar, Issák, and Alí—his chief and most favoured disciples, together with several horsemen, also went with him.

“ When they had reached the hills where the Zíá-rat or Shrine now stands, they attacked the Infidels and put them to the rout; and from thenceforth the Saint took up his residence, much against the advice of his followers and friends, at the village where his ashes now repose. After a short period however, the Káfirs again assembled in great force and attacked the holy man and his followers, who opposed them to their utmost, until the four disciples were slain, and obtained the crown of martyrdom. The head of the Saint had been severed from his body by the sword of an Infidel, (may dogs defile the graves of his forefathers and descendants) but the headless trunk, still continued to oppose them for a period of four days. At length, near the skirt of the hills, on a rising ground where the tomb now stands, Súltán Sakhí Sarwar sank down under an Arák tree and breathed his last.”

“ Tyrant of man ! imperious Fate !
 I bow before thy dread decree,
 Nor hope in this uncertain state
 To find a seat secure from thee.”

ALÍ BIN MUHAMMAD.

The attendants at the Shrine still show several pieces of this Arák tree, which are kept carefully wrapped up in a piece of cloth.

The disciples say that Mi'áh Ráná, and Khán Dhodá did not perish here; and that after the death of Sakhí Sarwar they set out for Bághdád. The book from which I have taken the preceding legend, however, is silent as regards Khán Dhodá; but it is stated therein that Mi'áh Ráná, and his mother—Bíbí Bá'ie—after the martyrdom of the Saint, prayed unto the Almighty to deliver them from the hands of these Philistines; and that the earth having opened almost immediately, they for ever disappeared from mortal ken.

The grave of Núr and Issák is on a neighbouring and more lofty hill, about five hundred paces to the west of the Shrine. It consists of a platform about eleven yards long by eight broad, and four yards high. On the top of this is a smaller platform on which are two tombs. The grave of Omar and Alí is situated a little to the north of the sepulchre of Núr and Issák, and is marked merely by a mound of stones or cairn, erected where they fell.

"If I must fall in the field, raise high my grave, Vinvela. Grey stones and heaped-up earth, shall mark me to future times. When the hunter shall sit by the mound, and produce his food at noon, 'Some warrior rests here,' he will say; and my fame shall live in his praise." OSSIAN.

Again to return to the book. "For some years the fact of the death of Sakhí Sarwar remained unknown, and at length had almost been forgotten; for the Mussalmans of those parts had been exterminated. At length one Malik Esau, a merchant, who was proceeding from Hindústán to Bághdád, chanced to halt for the night at the place where the town now stands, for it lies in the direct road to Kándáhar and Persia. His servants were busily employed preparing the evening meal, when what do they see but the vessels filled with blood! Dismayed at this, they ran and acquainted their master with the circumstance. He too, astonished at what had happened, stated that the place they were then standing on must have been the scene of martyrdom, or was the burial-place of some holy person; and he therefore directed them to prepare the viands at a greater distance off.

"At midnight, when it was time to load the baggage animals and proceed on their journey, the large camel which carried the merchant

suddenly became quite lame, and consequently he was under the necessity of sending on his fellow-travellers, and his own people, with the baggage, to the next stage ; whilst himself and son remained behind intending to await the morning's dawn, in hopes that the camel might be able to follow. When morning drew nigh, three horsemen made their appearance coming towards them from the hills, one of whom having advanced before the others cried out :—‘ Oh Malik Esau ! why art thou sitting thus sorrowful and distressed ?’ The merchant answered :—‘ How can I be otherwise when my companions have proceeded on their journey, and I am left alone here in this desert with my son—my camel lame, its load on the ground, and no other animal to supply its place ?’ The horseman who was no other than the Sarwar himself, said :—‘ Fear not, for by the time the day dawns your camel will be well again. Load him and set out on thy desired journey ; and when thou shalt have reached Bághdád, make known unto all people that in Hind, at a place sixty miles west of the city of Múltáu, on the skirt of the hills, there is a place of martyrdom ; and whosoever falleth into calamity and goeth there, shall, by the will of God, escape from it.’

“ Malik Esau on arriving at Bághdád related the wonderful accident which had befallen him on the journey, and as directed by the apparition, but no one would believe him ; so Esau to convince them of the truth of his statement killed the camel, and from the leg which had been affected with lameness on that occasion, he took out several iron nails. The most incredulous were now convinced ; and shortly afterwards two sick persons with their families set out on a pilgrimage to the grave of Súltán Sakhí Sarwar. One named Kho-ker was blind, and the other called Langá was afflicted with the leprosy ; but on their arrival at the scene of the martyrdom of the Saint, they were by a miracle restored to perfect health, and confidently believed that he would appear unto them. They were not disappointed ; for they had not been dwelling there very long before three horsemen came out of the hills one day and made towards them. They comforted them greatly, and bade them reside there altogether and take care of the remains of the Saint, promising at the same time protection from all ills. The horsemen stayed with them and said the *æasar* or meridian prayer, after which they disappeared as they had come.

"The next person who came and took up his residence at this place was one named Shaik who was impotent; and he too recovered and became an attendant at the tomb. The present attendants are descended from these three persons already mentioned, and constitute three different families—Khoker, Langá, and Shaik. The former are considered the principal, and are the most numerous: the Langás are the next in rank. In the course of time one Ahmed Khán, an Afghán, took up his abode here; and having attained the object of his wishes, he became a permanent resident, and a follower of the Saint. By the assistance of Ahmed Khán, for he was a wealthy man, they built the tomb over the ashes of Súltán Sakhí Sarwar, and from that time to this, people from all parts, both Hindú and Muhammadan, have sought it as a place of pilgrimage; and he whose heart is pure and clean, by coming here attaineth the object of his wishes."

Such is the legend of Súltán Sakhí Sarwar, whose odour of sanctity is so great as to draw crowds of people—Hindu and Muhammadan, Sikh and Belúch—yearly to his Shrine from all the surrounding countries.

The greater number of pilgrims who seek the Shrine are young women with old husbands, and those who may not have been blessed with children; many sick persons also come in hopes of being restored to health; and others to obtain increase of worldly goods. These make a small offering in money and vow to give a larger sum at the ensuing *Melá* if their wishes shall have been fulfilled. Sick people too, who may be unable to attend in person, make their vows by proxy, to present a certain oblation the next year should they recover their health.

It is related that a certain man, one of whose eyes had been affected with a disease for a long time, made a vow that if he should recover the use of the organ, he would present an eye of gold at the Shrine of the Saint. He recovered the use of it, and caused the golden eye to be made, as he had vowed he would do, with the intention of placing it on the Shrine in person. It was near the time of the *Melá*; and it so happened that one of the attendants, who was blind of an eye, being out as usual collecting contributions and donations in the name of the Saint, heard of the matter of

the golden eye, and the man's determination to present it in person. He therefore went and endeavoured to persuade him against undertaking so long a journey, saying that there was no necessity whatever for so doing, for he would himself present the oblation, and thus save him the trouble of going in person. He also urged as a reason, that the sooner the offering was made, the greater would be the merit, and therefore no time should be lost. A wag who was present, on hearing this, asked the disciple, whether the Saint really had the power of restoring sight to the blind. He answered that he had the power of granting every thing, and of fulfilling all desires. "If such be the case, says the wag, how is it that you are blind of an eye? He should at least have restored your sight, who are a servant of his threshold!" The attendant replied. "Do you not know, Oh, sinful man! that whatever the Saint grants to his votaries he takes from his *Majáwiran*,* and gives the latter something else in exchange? At the time of my birth he took the sight of my eye, and preserved it for the use of his votary, and determined that the eye of gold should be mine; therefore this man who has received my living or human eye, should give me the eye of gold, in order that thus right may obtain right."

The most respectable and enlightened Muhammadans of the district, such as Mallas and others, say that Sakhí Sarwar himself was doubtless a very pious and holy man, as is proved by the mention made respecting him in several books under the name of Suyed Ahmed; but they consider this *Melá* and its consequences in direct opposition to the rules and tenets of the true Orthodox Faith; and probably it would be so considered, even by the Suyed himself, in whose honor, and in whose name it is held.

The more southern districts of the Panjáb are remarkable for the number of *Melás* or Fairs. In the Múltán district alone there cannot be less than some scores in the course of a year.

Múltán, June 6th, 1855.

* مجاور *Majáwir*.—an attendant at a mosque, and devotedly employed or attached to it.

On the age of the Coal strata in Western Bengal and Central India.—By Rev. STEPHEN HISLOP, Nagpur.

The age of the coal field of Newcastle, Australia, has been a subject of discussion to as great an extent almost as the geological position of our Indian carbonaceous strata. For my own part, I have been inclined to acquiesce in the view of McCoy, who, in the *An. and Mag. of Nat. Hist.* vol. XX., endeavours to prove that the beds with vegetable and those with animal remains belong to different formations,—that the former are Oolitic, while the latter must be referred to Palæozoic times. Not having his paper at present in my possession, I cannot now adduce the arguments by which he seeks to establish his opinion; but it is of little consequence, as the evidence, which I shall bring forward, in the sequel, on the age of our Indian coal measures, will be independent of the Palæozoic or Mesozoic character of those of N. S. Wales.

Perhaps the most interesting part, in a section of the rocks of Central India, is the junction of the massive sandstone above with the laminated strata below. The latter, however various they may be in different localities as regards their lithologic and sometimes even their palæontologic features, may readily enough be distinguished by their relation to the superior beds, whose identity again is sufficiently attested by the iron bands, which run through their mass. This ferruginous sandstone is well developed at the Mahá-deva Hills, in the north of the province of Nagpur, in the vicinity of the city itself, and at Kotá on the Pranhítá, in the dominions of the Nizam. The subjoined sections represent the succession of the strata at these places respectively, as far as they are known :

1.— <i>Mahádeva Hills.</i>	2.— <i>Near Nagpore City.</i>	3.— <i>At Kotá.</i>
Massive sandstone with iron bands.	Massive sandstone with iron bands.	Massive sandstone with iron bands.
Carbonaceous and other shales with ferns, vertebraria, phyllothecea, &c.	Laminated argillaceous sandstone with ferns, vertebraria, phyllothecea, &c.	Argillaceous limestone.
Sandstone.	Sandstone.	Sandstone.
Green shale.	Green shale.	Bituminous shales with fishes.
	Red shale.	Clays with limestone.
	Crystalline limestone.	Red shale.
		Limestone.
85 feet. 45 ft. 25 ft. 15 ft.	75 feet. 40 ft. 30 ft. 15 ft.	80 feet. 27 ft. 25 ft. 23 ft. 11 ft. 8 ft. 4 ft. 9 ft. 500 ft.
2,000 feet.	50 to 100 ft.	50 to 500 ft.

In the preceding sections the dimensions depend partly on inference with the exception of those of No. 3, which were ascertained exactly by the measurement of the late Dr. T. L. Bell. They are, however, I believe, sufficiently accurate for the purpose for which they are given. That purpose is to exhibit the similarity, which exists among all these sections. Immediately under the upper sandstone, laminated rocks are seen in all. In section 1st, the shales are bituminous and carbonaceous, while in section 2nd, they are of argillaceous sand. But that they are of the same age, there can be no doubt, as many species of fossils are common to both. In comparing sections 1st and 3rd, we find that the latter instead of having the limestone all collected in the lower part of the section, as is the case at Nagpur and in many parts of the Nizam's country, has it interstratified with the shale; but leaving this peculiarity out of view, we perceive that in it the bituminous strata occupy the same position as in section 1st. The difference in organic remains between these two sections is more than counterbalanced by their agreement in the sequence of the inferior rocks, which (still omitting the interstratified argillaceous limestone from section 3rd, and choosing section 2nd as being better known for comparison with it, instead of section 1st) gives us in descending order sandstone and clay, red shale and limestone.

Now, if the fern-bearing coal shales and laminated sandstones of this province be the same as the fish-producing bituminous shales of Kotá, then the light, which the last mentioned beds afford regarding their own age, may be cast back on the other two. It is satisfactory to find, that the evidence supplied by the Kotá fossils is that of animal remains. The fishes that rewarded the researches of Drs. Walker and Bell have been pronounced by Sir P. Egerton to be true Oolitic forms, and probably of the age of the Lias; and therefore our vegetable organisms can be no older. To make this part of the evidence complete, and with the view of introducing some remarks on the testimony of our fossil plants, I may here mention, that between Nágpur and Chándá, at both of which places the upper sandstone has the usual iron bands, and the bare laminated beds the common vegetable remains, there is a district with Mángali as the centre (sixty miles S. of Nágpur) where the superior sandstone is less ferruginous, and the inferior or laminated beds are coloured by iron of a deep brick red. In the latter strata, where, from the analogy of the country both South and North of them, we should expect an abundance of ferns and stems, the remains of reptiles, fishes and entomostraca predominate, while the few vegetables that are found, are generally very different from those occurring in other parts of this territory. And yet from the position of this sandstone I have very little doubt that it is the same as that of the more ordinary appearance. The teachings of its Fauna are interesting. The skull of a *Labyrinthodont*, named by Owen *Brachyops laticeps*, might suggest for it a Triassic or even Carboniferous age, but the plentifullness of scales of lepidotoid fishes forbids us to assign a more ancient epoch than the Jurassic; and the conclusion is unavoidable, not that our laminated sandstone is older than the age we have attributed to it, but that the *Labyrinthodont* family has come down to a more recent period than is generally believed.

But now it is time to inquire what we are to learn from our fossil *plants*, regarding the age of the carbonaceous shales and laminated sandstone of this province.

The testimony of vegetable remains I do not reckon of trifling value. When they belong to a large genus like *Pecopteris*, which

has run through many successive changes of the earth's surface, than the information they supply is not very precise. But the very same may be said with greater force of the genus *Terebratula* in the Fossil Fauna. And I have observed that, even among plants of an undecided character as regards genus, there is generally some form, which distinguishes the species of one epoch from those of another. Besides, a geological age may be known from the abundance of a genus or family of plants at one period as compared with others. Though the discovery of a single species might not decide the question, yet if the genus, to which it belongs, culminates in a certain formation, and a particular stratum presents an unusually large proportion of that genus, then some idea may be formed of the age of that stratum. Such is the case with the entire fronded ferns. They reached their maximum development in the Jurassic period, as the Oolite of Scarborough, Stonesfield, and, according to H. Miller's recent researches, of the North of Scotland, plainly shows; and one of them, the genus *Tæniopteris*, which is so fitly associated in our carbonaceous strata with *Glossopteris* and *Cyclopteris*, is almost confined to the Oolite, there never having been an example of it hitherto met with in the true coal measures.

Having said thus much on the general principle, I proceed to apply it to special instances. There are three localities with which our strata admit of comparison—Stonesfield and Scarborough in England, and Richmond in Virginia U. S. The slate at the former British locality and the carbonaceous shales and sandstones at the latter, are universally acknowledged, I believe, to be Lower Oolitic; while the American coal formation referred to, is generally assigned to the same era. Now the connexion between our strata and the Stonesfield slate seems to be, the abundance of *Tæniopteris*, and a resemblance among the fruits or seeds. The similarity to Scarborough consists in the presence of what Lindley and Hutton call *Equisetum laterale* with its deciduous discs at the joints of the stem, a plant, which to the best of my knowledge has hitherto been discovered nowhere else. The relation to Richmond is more intimate still, *Tæniopteris magnifolia*, found there by Prof. W. B. Rogers, appears to be specifically identical with one of the same genus here; and the descriptions given of the Virginian *Calamites*

erroneously so-called, correspond exactly with the *Phyllotheças* of Central India. And if we are to count the strata of Mángali among the representatives of our carbonaceous shales, then they furnish other two points of comparison with the Richmond coal basin, viz. in a *Knorria*, and another stem, resembling a *Lepidodendron*, but which may be called an *aphyllum* or perhaps *Aspidiaria*. I might here add a third link of connexion between those Mángali and Richmond beds, viz. the occurrence of two forms of *Entomostreaca* belonging to the genus *Estheria*. But in this instance, the evidence of the Fossil Fauna is not so distinct as that of the ancient Flora. The inference to be drawn from a particular species of *Tæniopteris* being common to the rocks of Eastern Virginia and Central India is, in my opinion, conclusive as to their contemporaneousness; but not so that drawn from the discovery of *Estheria* in both, as the genus just named, after having been too frequently taken for a mollusc, is now recognised in the carboniferous formation, and, I believe, the old red sandstone, as well as in the Lias, the Oolite, and the Wealden. Judging from Sir C. Lyell's figure, there is a great agreement between his species and ours, but when Rupert Jones, one of our best authorities in this department, is able to pronounce upon them, his decision will set the matter at rest.

I suspect that a good many other instances of resemblance between our fossil plants and those of admitted jurassic strata might be pointed out; but materials as yet are deficient. There is still wanting a revision of our ancient flora, discriminating between true Carboniferous and Oolitic types. For example, how long have all furrowed stems in Europe and America, and I need not add India also, been referred to *Calamites* and more rarely *Equisetum*, whereas many of them, viz. those characterized by the absence of tubercles, and the opposite arrangement of their sulci, must undoubtedly be classed under the genus *Phyllotheca*. To establish some such clear distinction as this, is a step towards the determination of the age of the rocks, in which those stems are respectively met with; while an alternate furrowed tuberculated stem is never found in the Oolite, on the other hand, the stems destitute of tubercles and with opposite sulcation almost exclusively occur in that formation.

Hitherto my remarks have been confined to the carbonaceous strata and laminated sandstone of Central India. In now including the coal measures of Bengal in my comparison, I must bespeak indulgence, as I have personally examined none of the strata or fossils of that part of India, and must depend wholly on the descriptions and a few figures that have already been published.

By "coal measures of Bengal" of course I do not understand those on the N. or N. E. of Calcutta, some of which doubtless belong to a Tertiary age; but I mean those on the W. and N. W. of the Indian Metropolis, of which the strata in the Dámudá basin may serve as a specimen.

These strata, I consider to be the same as what we have in the north of this province, and therefore, if my previous reasoning has been sound, they also are to be regarded as jurassic. The grounds of my identification are 1st, similarity in organic remains, and 2nd in geological position.

1. *Similarity of organic remains.*—In the bituminous shales of the Mahádeva we have the following Bengal fossil plants: *Tryzygia speciosa*, *Vertebraria indica*, and a species of *Phyllotheeca*, a fragment of which is figured by Dr. McClelland as *Poxites minor*. Geol. Jurn. Tab. XVI. f. 4. In the carbonaceous shales of Umret, besides the *Phyllotheeca* now alluded to, another stem, but unfurrowed, which seems to resemble McClelland's *Poxites muricata*. Tab. XIV. f. 6. In the laminated sandstone of Kámpti, in addition to *Vertebraria* and the two *Poacites* as above, *Tæniopteris*, perhaps of the same species as at Rájmahal, and McClelland's *Pecopteris affinis*, Tab. XIII. f. 11 b., which in our specimen, is seen to be a well marked species with a tripinnate frond.

In all these localities, the genus *Gloscopteris* abounds, but it is so difficult to represent in a figure its minutely anastomosing venation, that nothing but a comparison of specimens side by side would warrant the identification of species. However, there is little fear of any of the Bengal ones failing to find a match among some of ours, as from the sandstone and coal shale, we must have about twelve species in all, many of them very perfect and in the height of fructification. While we seem to have outstripped North Eastern India in *Cyclopteris* and several other vegetable remains,

we are decidedly behind in regard to the Cycadeaceæ. The only specimen, which I have procured is a small fragment from the sand-stone of Kámpti, the leaflets of which are narrower than the minutest blade of grass, that I have ever seen.

2nd. *Similarity of geological position.*—It may be supposed that, though there is a general agreement in fossils between the coal strata of Bengal and oolitic rocks here, yet their position may be slightly different. However, from all the descriptions of Bengal coal strata, to which I have had access, I have noticed that where the sandstone is present to afford materials for comparison, the tendency to bituminous and carbonaceous shales there, as here, occurs immediately under the great mass of arenaceous beds. In proof of this I need only refer to the sections given by Mr. Homfrey from* Palamow and Singrá, and to the observations made by Mr. Osborne on the supposed coal-field at Umláh ghât near Bidjeegurh.†

In conclusion I would add, that though among the Cutch oolitic strata some are evidently marine, yet from what I have seen of those in the Deccan or read of those in Bengal, I know of none of them in either of these districts that exhibit the least evidence of having been deposited in the sea or ocean: all seem to be of fresh-water origin.

* Beng. As. Soc. Journ. Vol. XI. p. 738. † Ibid. Vol. VII. p. 843.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR MAY, 1855.

At a meeting held on the 2nd instant at the usual hour,

SIR JAMES W. COLVILE, Kt. President, in the chair.

The minutes of the last month's proceedings were read and, after some modification, confirmed.

Presentations were received—

1. From the Right Rev. the Bishop of Victoria, forwarding through the Rev. Mr. Cuthbert, a copy of the Gospels of Luke and John, the Acts of the Apostles, and the Epistle to the Romans, in the Loochooan language, and promising soon to send St. Luke's Gospel in Japanese.

2. From J. Watson, Esq. B. C. S., two more specimens of fossil wood and leaf impressions of a species of Cycas from Rajmahal.

With reference to the specimens, Mr. Pontet of Bhagulpore states that “The Fossils are to be had at Bindrabun, a small hill south east of Terriagully—six miles; but any body wishing to find them, ought to go to the dâk stage called Shahabad and then down my road half a mile and turn to the left.”

3. From Capt. Saxton, Pooree, announcing despatch of further specimens of coal from Gangpure and of iron stone from Gurjang in the Autmallie Rajah's territory.

Capt. Saxton writes as follows:—“I have to advise you of the despatch, by cart to the Calcutta Exchange, of a further supply of the “Gangpur” coal. I have also sent some iron stone, which I met with in a village (Gurjang) in the Autmallik Rajah's territory, and which, from what I learnt from the people employed in manufacturing the iron, is of a more valuable description, than what is usually found in such abundance in many parts of the Tributary Mehals of the Cuttack and S. W. Frontier Agencies. The villagers, speaking from conjecture,

say, they obtain a *fourth* of iron from this stone. This conjecture may be far out, but they seemed aware that this one was richer than that obtainable in other parts. The process of manufacture was also somewhat different. The stone goes through a preliminary process of roasting with wood fuel, and is then beaten into a *powder* for smelting with charcoal (made from saul wood) fuel in the usual manner. No flux is ever used, though lime is very abundant, all over these districts. Merchants from Cuttack and Ganjam purchase all the iron made, payment being given by advances in grain, at a rate very unfair for the manufacturer. I have sent specimens of the ore and iron in their several stages. The ore is procured in any quantity by digging immediately below the surface.

"I have also enclosed two other curious specimens. The soft red stone was strewed over a part of the large valley west of the Gangpur coal bed. I had occasion to erect a stone mound, and only that description of stone was at hand, and my mound now stands made of similar stones all streaked inside like these specimens, the streak taking different forms, corresponding more or less with the shape of the stones."

4. From the Government of the North Western Provinces through W. Mayne, Esq. Offg. Collector of Banda, eleven copper Sunnads of maffee villages in Zillah Banda.

5. From Dr. Falconer, a full and descriptive Catalogue of the Tertiary Fossils in the Society's Museum, classified, so far as the specimens admit of identification, according to the localities in which they were found and showing the names of donors.

6. From William Cobb Hurry, Esq. specimens of pottery found in Sunderbund Grant No.— by Mr. Thierry, seven feet below the surface of the ground, while digging earth to make bricks.

His Highness Mohammad Hossain Ally Ex-Ameer of Scinde, duly proposed and seconded at the last meeting, was elected an ordinary member.

The following gentlemen were named for ballot at the next meeting.

T. Thomson, Esq. M.D. proposed by Mr. Grote and seconded by the President.

J. W. Sherer, Esq. C. S. proposed by Mr. Allen and seconded by Mr. Grote.

Dr. Montgomerie, proposed (for re-election) by Lt. Lees and seconded by Dr. Boycott.

The Council submitted reports—

1. Recommending that the offer of Dr. Sprenger to edit a Geographical Treatise of the 4th Century of the Hijerah be accepted.
2. Recommending that the following offers also be accepted, viz. that of Mr. Hall, to edit the Kávaya Darsa of Dandi with the same author's Das'a Rupaka, that of Lt. Lees, to edit the Nakhabatul Fikr, and that of Mr. Hall, to bring out, in conjunction with Pundit Ramnarain, the text of the Vishnu Purána.

Regard, however, being had to the existing liabilities of the Oriental Fund, they recommended that the printing of these works be postponed till next year.

3. Submitting for the favorable consideration of the meeting, a report from the Natural History Committee, recommending the disbursement of Rs. 1500, on cases for the newly arranged Department of Tertiary Fossils, and suggesting that the Society should solicit the aid of Government for paving with Chunar stones the whole of the ground-floor of the Museum.

The following is the report of the Committee:—

“In submitting to the Council an application for a grant of money to ensure the preservation of the instructive and valuable series of fossils lately arranged by Dr. Falconer, the Committee of Natural History would suggest to the Council that the present offers a favorable opportunity for soliciting the aid of Government towards the carrying out of several measures essential to the conservation of the many valuable collections, now forming the museum.

“The principle of occasional grants to the Society for special purposes, is distinctly recognized in the following paragraph of a letter from the Honorable Court of Directors, dated 18th September, 1839.

“‘The independent and useful activity of the Asiatic Society of Bengal during so long a period, entitles it justly to your consideration, and looking to it as the only institution in India, which offers any analogy to the great national libraries and museums of Europe, it is a legitimate object of public support. We therefore, approve of the aid and encouragement which you have given. We think, however, that the extent to which you have gone is fully adequate to all purposes of public utility. The Society is already in possession of a library and museum of some extent, and the additions that may be

made to either must be occasional and progressive. It does not happen in India as in Europe, that large public or private collections of a rare and valuable description are offered for sale, and all accessions which the Society will have an opportunity of acquiring must be of limited extent and incidental occurrence. From the character too of the persons who are likely to contribute to the Society's collections, it is very improbable that a pecuniary equivalent will in all cases be desired, and it seems to us, on various grounds unnecessary and objectionable to assign to the Society a permanent grant for the purpose of effecting occasional purchases. When an application from the Society comes before you for any definite outlay, it will be time enough to take into consideration the expediency of granting the particular assistance that may then be required. We shall not object to your granting to the Society funds for special purchases as occasions arise, as far as may be compatible with a due regard to public economy. On all such occasions you will forward to our Museum a selection from the articles which may have been so procured.'

"Your Committee deem that one of the most important requirements of the Museum is a pavement of Chunar stone in the basement story. The necessity for such a pavement arises from the Museum being thrown open to the public, who frequent it in considerable numbers, constantly wearing the floor and unavoidably giving rise to clouds of dust which materially injure the specimens.

"It is in the freedom of access that the Society offers an analogy to the national museums of Europe, and by throwing open to the public the rich stores of Natural History, collected from all parts of Asia, contributes to the growth and spread of science and education among the natives and residents of India. On these grounds the Committee consider themselves warranted in soliciting the assistance of Government, the remedying of the great evil now complained of by the substitution of Chunar stone pavement for the present very inefficient one of lime and bricks.

"The Committee submit an estimate amounting to Co.'s Rs. 1500 for eight glazed cases which they consider absolutely necessary for the preservation of the fossil remains, in the order in which they have been arranged by Dr. Falconer; an order which, if once destroyed, it is doubtful if any man in India could restore, they therefore urge

upon the Council to sanction this expense great as it appears, that the labours and scientific knowledge devoted to this arrangement, be not lost.

"As connected with it, they would recommend the printing of the catalogue of these fossils ;—a most masterly and erudite description of all the specimens, the publication of which will reflect no less credit upon the Society than upon its author Dr. Falconer."

W. E. BAKER,
M. BOYCOTT,
G. G. SPILSBURY,
A. C. MACRAE,
A. GROTE.

The recommendations were adopted.

The Council also submitted a recommendation to the effect that the thanks of the Society be offered to the following gentlemen for the Meteorological information which, in compliance with a request made by M. Leverrier of the Paris Observatory and circulated by the Council, they have furnished to the Secretary for transmission to Paris :—

Sir R. C. Hamilton, Bart., Indore. Sir H. Lawrence, K. C. B. at Mount Aboo. Major Hollings, Shahpore. Mr. Edgeworth, Jullundur. Mr. Purdon, Dilur. Mr. C. Gubbins, Allighur. Dr. Fayer, Lucknow. Major G. Ramsay, Nepal. Major H. B. Edwards, Peshawur. Capt. Elliott, Nagpore. Major Phayre, Rangoon. Capt. Hopkinson, Akyab. Lt.-Col. Jenkins, Gowhatta. Dr. Duka, Comillah. Dr. Withecombe, Darjiling. Babu Rádhanáth Sikdar, Calcutta.

The Council further reported that they have allowed to the Librarian a commission of 10 per cent. on the proceeds of books sold from the Library.

The several recommendations having been put to the meeting *seriatim* were carried.

In compliance with the notices given at the last meeting, Mr. Houstoun asked to have laid before the meeting all notes or comments relating to the introduction or cancellation of any introduction to No. 80 of the *Bibliotheca Indica*.

The President stated that there were objections to the production of these papers and declined to produce them. He further stated that no passage in the introduction in question had been cancelled.

Mr. Houstoun next proposed that the Society request Mr. H. V. Bayley to accept the Joint Secretaryship of the Asiatic Society, but on the President pointing out that there being no vacancy in the Council such a procedure would be against the rules of the Society, he withdrew the motion.

Mr. Houstoun then wanted to know what communications are, as a matter of course and in what stage, to be laid before the Society, and for what communications the Society must depend upon the Council?

The President, in reply, referred him to Bye-laws 64, 77, 78 and 79.

Mr. Houstoun also wished to know by whose advice and authority the niche has been made in the Society's meeting-room to the obstruction of a proper circulation of air.

The Secretary stated that the niche had been built and the cast of Sir P. Cautley's bust placed there with the sanction of the Council.

Communications were received—

1. From E. Blyth, Esq. submitting a report on a zoological collection from the Somáli country.
2. From Capt. Tickell, the description of a new species of *Buceros* from Tenasserim.
3. From B. H. Hodgson, Esq. Comparative Vocabulary of the languages of the broken tribes of Nepal.

The Secretary exhibited to the meeting MS. of a Limboo work supposed to be the only work extant in that character, belonging to Capt. Mainwaring and kindly left by that gentleman for exhibition.

The Librarian and Curator of the Zoological Department submitted their usual monthly reports.

Report for May Meeting, 1855.

Our gatherings for the last month consist of

1. The collection from the Somáli country made by Lt. Speke, of the 46th N. I., and forwarded to the Society by Lt. Burton, in command of the expedition into that region. Upon this I have elsewhere reported.
2. We have received two packages of bird-skins, from Lt. Alex. J. Trotter, of the Bengal Artillery, Peshawur. The most remarkable specimens are the European Rook (*CORVUS FRUGILEGUS*), which was previously observed in Afghanistan by Capt. Hutton,—the *PASSER SALICICOLUS* (Vieillot, v. *hispaniolensis*, Tem.), also obtained in Afghanistan by Capt. Hutton,—and *EMBERIZA ESCLAVONICA*, Brisson (v. *E. pithyornis*,

Pallas, and *E. albida*, nobis), previously obtained by Capt. Hutton in the Tyne range between Masuri and Simla. The European Jackdaw (*CORVUS MONEDULA*), as well as the Rook, occurs at Peshawur; and the former of these is very common in Kashmir.*

3. Babu Rajendra Mallika. A dead Monkey, *MACACUS CYNOMOLGOS*.

4. J. Uvedale, Esq. A small snake, which fell down from a cocoanut tree in the neighbourhood. The species appears to be undescribed, and may rank as

DIPSAS HEXAGONOTUS, nobis. Specimen evidently quite young; but well distinguished from the common *D. TRIGONATA* by a series of broad hexagonal scales, commencing at the occiput and continued along the whole back. The lateral scales (towards the abdominal plates) are distinctly grooved. Head as in *D. TRIGONATA* and various allied species. Colour of specimen bright ruddy-ferruginous, inclining to coral-red; paler below, and mottled with black bordering some of the scales of the upper-parts. Head green, the throat white, and the labial plates posterior to the eye yellow: a slight blackish occipital streak. Scutæ 247: scutellæ 126 pairs. Rows of scales 21. Length of specimen 18 in., of which tail 4 in. It probably grows to a large size, and may become wholly green.

We take this opportunity to remark, that we are at present in temporary possession of a fine living specimen of the *GRUS AUSTRALASIANA*, Gould (or 'Native Companion' of the Australian colonists); which, until recently, was supposed to be identical with *GR. ANTIGONE*, (L.), or the Indian *Sáras* or *Surhuns*. Mr. Gould's figure of it, in the 'Birds of Australia,' is far from being one of his best. The Australian Crane has much more of the aspect of *GR. VULGARIS*, Pallas; but is considerably larger, with the head bare and papillose to just below the conspicuous patch of grey ear-coverts, and a dewlap-like throat-wattle or pendulous lappet of skin (of a black colour with red or carneous anterior edge), which is

* In a letter dated April 22nd, Lt. Trotter remarks—"I observe that those flights of *PASSER SALICICOLUS* have begun again this month; and I am afraid that their appearance is a sign of the approaching hot weather. They fly in large flocks towards sunset, in every direction, and turn about all at one time." Again, after a visit to Kohat, he writes—"I saw immense flocks of *PASSER SALICICOLUS* at Kohat, where it is called the 'Kabul Sparrow.' They roost in thousands on the trees there, and we fired once or twice at them, and knocked over upwards of 50 at one shot. I even heard that 117 had been brought down at a single shot." Lt. H. M. Drummond, of H. M. 42nd Regt., notices the highly gregarious character of this species in Barbary, where it is the common House Sparrow of the country. *Vide Ann. May. N. H.* XVI, 107.

peculiar and characteristic. In GR. ANTIGONE, the red papillose skin of the neck extends down about 4 in. below the grey ear-coverts, which form a smaller patch than in the Australian bird. Both species have the crown slaty, and bright orange-yellow irides; but as seen from a little distance, the Australian shews conspicuously a crimson occiput with contrasting black throat-wattle, the cheeks being of a paler red; while the Indian exhibits a much greater extent of crimson on the neck and throat, with some black bristle-like plumes on the throat, occiput, and upper part of the neck, more or less developed in different individuals. The legs of the Australian species are shorter than in GR. ANTIGONE; being of the same proportions and of the same dusky slate-colour as in GR. VULGARIS: whereas those of GR. ANTIGONE are crimson-roseate. The tarsi, in GR. ANTIGONE, measure 12 to $12\frac{1}{2}$ in.; in our specimen of GR. AUSTRALASIANA, but $10\frac{1}{2}$ in. The latter has the plumage uniformly ash-grey, with the lengthened tertaries neither curled as in GR. VULGARIS, nor albescent as in GR. ANTIGONE. In the vivarium of Babu Rajendra Mallika, there are, at the present time, several dozens of GR. ANTIGONE, and also of GR. VULGARIS and of GR. VIRGO; and we remark that about the month of April all of the first species (or *Sáras*) assume a broad pure white collar immediately below the crimson papillose skin of the neck: they then illustrate the *Gr. torquata*, (Latham), Vieillot, which accordingly is merely GR. ANTIGONE in its nuptial plumage. We have known instances of the *Sáras* breeding in captivity, when a pair is allowed the range of a large walled garden (protected from Jackals), containing shallow inundated enclosures for the growth of rice: in these the nest is commenced under water, and raised for some inches above the surface; and the eggs are two in number, about $3\frac{3}{4}$ in. long by $2\frac{1}{2}$ in. broad, of a bluish-white with a few distantly placed rufous specks and blotches. The young follow their parents from the first (unlike those of the ARDEADÆ), and have the head and neck clad with feathers of a dull light ferruginous colour, which begin to fall when the bird is more than half-grown. Besides the three Indian species of Crane here mentioned (of which the *Sáras* alone is known to breed in the country), a fourth occurs as a great rarity in the N. W., the GR. LEUCOGEANOS, Pallas (white, with black primaries, bald face, and pinkish-red legs). This fine species was procured by Burnes in Afghánistán; and we have been assured that it has been occasionally observed in Rájastán. Schlegel even gives Bengal as a habitat (which we cannot but think requires confirmation, even though skins may have been received *rid* Bengal)! A fifth Asiatic Crane exists in GR. MONTAGNESIA, (C. L. Bonap.), from Mantchuria; a sixth in GR. VIPIO, Pallas, which chiefly inhabits the extreme east, as the Corea, Japan, &c.; and there is

even another in Japan (besides also GR. VULGARIS),—the GR. MONACHA of Temminck.*

We may also here notice, that we have received from Robt. F. Tomes, Esq., of Welford (near Stratford-on-Avon), a large number of most carefully taken descriptions of the specimens of Indian Bats and Shrews in the British Museum and that of the Hon'ble E. I. Company in London; the actual specimens upon which Dr. Horsfield and Dr. J. E. Gray have founded and named sundry species. As regards the Shrews, Mr. Tomes has *independently* arrived at several conclusions identical with those expressed in the Memoir on the Indian species of Shrew, published *ante*, p. 24 *et seq.*: and, with reference to the *CROSSOPUS HIMALAYICUS*, Gray (p. 37 *ante*), he writes—“The specimen has the same dentition as *SOREX CÆRULESCENS*; but the teeth appear to me to have been pushed into the mouth from the outside, and no doubt belong to some other animal,—the skull having been removed, and these teeth introduced to conceal it [!] It is a good species; and, I think, has the tail ciliated, but having been slit up along the under-part by the Skinner, it is difficult to determine.” He also remarks that “*SOREX CAUDATUS*, Hodgson, is certainly very closely allied to *S. ALPINUS* of Europe, if not identical with it” (vide also p. 37 *ante*). Our *SORICULUS* (p. 36) is probably identical with *BLARIA*, Gray. Mr. Tomes believes *S. CÆRULESCENS* and *S. indicus* to be “of one species. *S. MURINUS*,” he adds, “is also very nearly allied, but has the fur much longer and of a much browner colour, and it looks coarser. *S. GRIFFITHII*” (apparently *murinus* apud nos, not the Malayan *MURINUS*), “is evidently distinct, having a totally different kind of fur, larger teeth, and different dimensions. *S. NIGER* of Elliot is a miniature of *V. GRIFFITHII*, but with a long and slender tail. All of these are of the same type as *S. CÆRULESCENS*.†

* For a Conspectus of the species of Crane, *vide* the Prince of Canino in the *Comptes Rendus*, XL, 720 (April 2nd, 1855).

† The following is a new species of typical *SOREX*, recently received from Capt. Berdmore, of Schwe Gyen, Pegu.

S. FULIGINOSUS, nobis. Length of adult female (taken out of spirit) $5\frac{1}{2}$ in., of which tail $2\frac{1}{2}$ in.: foot *plus* $\frac{1}{2}$ in. Skull exactly 1 in. long, and $\frac{7}{16}$ in. in greatest diameter: length of series of upper teeth $\frac{7}{16}$; and breadth of palate $\frac{1}{8}$ in. Soles bare to the heel. Tail with seventeen vertebræ, and perhaps a minute eighteenth at tip; the scattered long hairs upon the tail small and fine. Fur dense, porrect, somewhat velvety; dark slaty at base, the rest fuliginous-brown, with inconspicuous dull hoary tips: beneath scarcely (if at all) paler. A second specimen merely differs in having a trifle smaller.

As Mr. Tomes will probably edit a reprint of the Memoir referred to, it is unnecessary to go further into detail here with the Shrews; and with regard to the Bats, as we hope to prepare a similar Memoir on the Indian species of this ordinal group, it will suffice, in the present instance, to note a few identifications of some interest.

Mr. Tomes remarks, that—"Specimens of *Plecotus*, and of *Barbastellus*, from Nepal, forwarded by Mr. Hodgson to the museum of the Hon'ble E. I. Company, are perfectly identical with examples of the same genera from my own collection, taken here [in England], and which are now placed by the side of the Indian specimens in Dr. Horsfield's case." (*Vide* also *J. A. S.* XXI, 360). We have also minutely and carefully compared European and Masuri specimens of *Scotophilus serotinus* and *Sc. Leisleri* (*v. dasycarpus*), and can detect no difference whatever; the latter species varying in shade of colour. *Vesp. labiata*, Hodgson, does not appear to have been, as yet, properly compared with the European *Noctulinia altivolans*; in other words, sufficiently good specimens of each have not hitherto been compared together: but there seems to be little doubt of their identity. *Myotis murinus* of Masuri accords minutely with the descriptions of the European species: and perhaps *V. pallidiventris*, Hodgson, may yet prove identical with the European *M. pipistrellus*; so far as we can judge from specimens of the former, presented to the Society's museum by Mr. Hodgson, but unfortunately in bad condition, there is no difference whatever in size and structure from the European *pipistrellus*; but the fur of *M. pallidiventris* would seem to be more ruddy (and tending to *vinaceous*) above, and also more albescens on the lower-parts. Two affined but distinct species exist in *M. parvipes*, nobis (*J. A. S.* XXII, 581), from Masuri, and *M. theobaldi*, nobis (*pallidiventris apud nos, ibid.*), from Kashmir. The latter is remarkable for the comparative great size of its foot, which with claws measures $\frac{7}{8}$ in.; and for its non-rufous dark dull brown fur above, and more or less albescens on the lower-parts.

E. BLYTH.

LIBRARY.

The following books have been added to the library since the 3rd of April last.

Presented.

Natuurkundig Tijdschrift voor Nederlandsch Indië, Vol. VII. Nos. 5 and 6, and Vol. VIII. Nos. 1 and 2.—*BY THE EDITORS.*

The Journal of the Indian Archipelago,* Vol. VIII. Nos. 7 to 9, 2 copies.—*BY THE GOVERNMENT OF BENGAL.*

Selections from the Records of the Bengal Government, Nos. XV.
XVII. and XIX. two copies each.—**BY THE SAME.**

Reports with Proceedings and Appendix of the Committee appointed
by Government to enquire into the State of River Hooghly, foolscap,
folio.—**BY THE SAME.**

Report on the Settlement in the district of Kangra in the Trans-
Sutledge States, by G. C. Barnes, 4 copies.—**BY THE CHIEF COMMISSIONER OF THE PUNJAB.**

The Indian Annals of Medical Science, No. 4.—**BY THE EDITOR.**

The Oriental Christian Spectator, No. 3.—**BY THE EDITOR.**

The Calcutta Christian Observer, for April, 1855.—**BY THE EDITORS.**

Proceedings of the Royal Society, No. 8.—**BY THE SOCIETY.**

The Oriental Baptist, No. 100.—**BY THE EDITOR.**

The Upadeshak, No. 100.—**BY THE EDITOR.**

Exchanged.

The London, Edinburgh and Dublin Philosophical Magazine, No. 57.

Purchased.

Comptes Rendus, Nos. 1 to 5 of 1855.

The Edinburgh Review, No. 205.

Journal des Savants pour Janivar, 1855.

Biblische Legenden der Muselmáner, von Dr. T. Weil, *Frankfort,*
1845, 12mo.

RA'JENDRALA'L MITTRA.

May 1st, 1855.

FOR JUNE, 1855.

At the usual monthly general meeting of the Society held on the
6th instant,

Sir JAMES W. COLVILE, Kt. President, in the chair.

The minutes of the last month's Proceedings were read.

Mr. Houstoun objected to certain passages in the record and which
he pointed out as incorrect. On the minutes being confirmed, he handed
in a protest in the following terms; viz. "I protest against this record
being taken as a true and correct account of the proceedings of the
Society."

Presentations were received—

1. A collection of oolitic and tertiary fossils from Rev. S. Hislop
and Rev. R. Hunter, with a few of the latter from W. W. Rawes, Esq.
Madras Medical Service and Capt. Macauley, 23rd Regt. M. N. I.

The following is an extract from a letter dated 5th April last, from Mr. Hislop, which announced his intention to send these fossils.

"In an account of the proceedings of your last meeting (March 7th,) I was glad to notice the addition to your Museum of a fossil stem and leaves of Cycas from the Rajmahal hills, presented by Mr. Watson —also the announcement, by Captain Saxton, of the discovery of fossils in the Gungpore Rajah's territory. We have from here several stems, more especially in the laminated sandstone underlying, what used to be called in Peninsular India, the diamond sandstone, the former of which is the equivalent near the city of Nagpore of the coal fields in the North of this Province, and on the banks of the Damuda and other parts of Bengal. If you could kindly obtain an outline drawing of the stem for me to compare with those here, I should feel much obliged to you. Could you also give me some idea, either by a drawing or written descriptions, of the genera of the Gungpore fossils? If you have in your Museum any other Indian sandstone and coal organisms over and above those published by McClelland in his geological survey, I should be much indebted to you, if you would have the goodness to favour me with a sketch of them for the purpose of comparison. What is Pustularia Calderiana, said to be found on the Damuda coal field?

"Have you got any shells from the limestone found in connexion with the trap of the Rajmahal Hills which Capt. Sherwill considers a fresh water deposit?

"As a sort of specimens of the rough sketches that would be useful to me I send you some hasty outlines of several of the fossils discovered here in our laminated sandstone and coal. Besides these Jurassic remains, which all appear to indicate fresh water deposit, we meet in a lacustrine stratum, generally underlain and overlain with trap, with an abundance of tertiary organisms, such as small bones, fish scales, the elytra of beetles, Entomostraea and Mollusca; and fruits, seeds, leaves, roots, and trunks of trees. These are, for the most part, so minute and numerous that it would take longer time to copy them for you, than I am able to afford. My colleague, the Rev. Mr. Hunter and myself have had packed up in a box for the last year a selection of oolitic and tertiary fossils for your Museum, but we have not been able to hear of any convenient mode of transmission to Calcutta."

2. From J. Pontet, Esq. Rajmahal, impressions of Ferns (*Pecop-*

teris, Taeniopterus) of Ptilophyllum, casts of stems, &c. in soft earthy sandstone, from Bindrabun, N. W. corner of Rajmahal Hills.

3. From Her Majesty's Government through the late Sir H. Dela-Beche, the volumes hitherto published of Memoirs of the Geological Survey of Great Britain and of the Museum of Practical Geology, British Organic Remains, Records of the School of Mines, &c. and Dr. L. Playfair's Essay on Industrial Instructions on the Continent.

Capt. James, who kindly took charge of these books from Sir H. Dela-Beche states :

"Sir Henry informed me that he was sorry he was not empowered to send a set of the beautiful Geological Maps which belong to these Memoirs, but he at the same time told me he had no doubt they would be furnished to the Asiatic Society of Bengal, if an application to that effect were made to the Lords of the Treasury by the Court of Directors.

"I therefore beg to propose, on account of the great interest attaching to these valuable Maps, that a letter be addressed to the Hon'ble the Court of Directors on the part of the Asiatic Society of Bengal, requesting that the Court will apply to Her Majesty's Government for a set of the Geological Survey Maps of the United Kingdom, to be placed in the Library of the Society."

4. From R. H. Maddocks, Esq. Deputy Commissioner, Gurudas-pur, four copper coins from a trove of thirty discovered in digging the foundation of a jail at Gurudaspur. Three of the coins are of the reign of Sikandar Shah Behlol of Delhi, and the fourth is illegible.

5. From Col. Goodwyn, two copies of a lecture delivered at the Bethune Society, being a project for the incorporation of a Society of Arts and Sciences in Bengal.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members.

T. Thompson, Esq. M. D. F. R. S.

J. W. Sherer, Esq. B. C. S.

Dr. W. Montgomerie, B. M. S. (re-elected).

The following were named for ballot at the next meeting :—

W. S. Atkinson, Esq. Principal of la Martiniere,—proposed by Mr. Beadon and seconded by Mr. Grote.

T. C. Loeb, Esq. B. C. S.—proposed by Mr. Riddell and seconded by Mr. Allen.

Mr. Houstoun gave notice of the following motion for the next meeting.

"That I may be allowed to see and have access to all papers, the property of the Society."

The Council submitted reports.

1. Recommending that Mr. Hall's offer to edit the Aphorisms of the Nyáya with the Commentary of Rishi Vátsyáyana, for publication in the *Bibliotheca Indica*, be accepted.

2. Stating that they have elected, subject to the confirmation of the Society under the 60th Byelaw, Dr. Spilsbury, a Vice President, and Mr. H. V. Bayley and Capt. James, members of the Council, in the room of Col. Baker and Capt. Thuillier resigned.

The recommendations were approved and adopted.

The President, after noticing the death and public services of Major-General Forbes, proposed "that the Society record its regret at the loss of one who for many years had been a valuable member, and was formerly one of the Vice-Presidents of the Society."

Resolved accordingly.

Communications were received—

1. From J. J. Grey, Esq. Malda, enclosing a paper pointing out a simple method of manipulation in the Calotype process.

2. From Bábu Rádhánath Sikdár, forwarding abstracts of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1854, and Jan. and Feb. 1855.

The Secretary then read the following correspondence which had taken place between the Government and the Council.

No. 1237.

*From the Under-Secretary to the Government of Bengal,
To the Secretary to the Asiatic Society.*

*Dated Lt.-Governor's Camp, Raneegunge, Zillah West
Burdwan, the 3rd March, 1855.*

[GENERAL.] "Sir,—I am directed to state that the Lt.-Governor, on the occasion of his recent visit to Rhotas, has observed with much regret that the remains of the old Palace there, in which the people of the whole surrounding country feel the liveliest and most unaffected in-

terest are, although the unquestioned property of Government, rapidly going to decay and that unless measures be taken to preserve them, they will certainly before long fall into irretrievable dilapidation.

"I am therefore desired to request that the Council of the Asiatic Society will favour the Lt. Governor with such information as they may possess on the subject of these ruins, and with an opinion as to whether their history and character is such as to warrant the Government in expending a moderate sum for their preservation.

I have, &c.

(Signed) H. PRATT,

Under-Secretary to the Government of Bengal."

*From the Secretary to the Asiatic Society,
To the Secretary to the Government of Bengal.*

Dated the 7th April, 1855.

SIR,—I am directed by the Council of the Asiatic Society to acknowledge the receipt of Mr. Under-Secretary Pratt's letter, dated the 3rd ultimo, No. 1237, and in reply to express on behalf of the Society the gratification which they derive from this announcement of his Honor's interest in the antiquities of the country.

Nearly all that is known of the history of the ruins on Rhotasgurh is compiled in the account of them given by Buch. Hamilton, published in the first Vol. of Martin's Eastern India. The stratagem by which the hill was first wrested from its Hindu Chief is narrated by Stewart in his history of Bengal.

A translation of the Sanscrit inscriptions dated 1631, over the *Kothoutiya Gate* of the Fort will be found in Vol. 8 of our Society's Journal, but the authenticity of the Genealogy contained in the inscriptions has never yet been satisfactorily worked out.

I am desired to add that, in the Society's opinion, all the standing ruins at Rhotas are well deserving of the attention of Government, and to express the pleasure with which they will co-operate, if permitted, in any measures which His Honor may take for preserving them from further dilapidation.

I have, &c.

(Signed) A. GROTE,

Secretary, Asiatic Society of Bengal.

The Secretary also exhibited to the meeting a portfolio of Entomological drawings placed at his disposal for the purpose, by Mr. R. W. G. Frith. The drawings represented the transformation of various Indian Lepidoptera, and were beautifully executed by a native artist, Moonshi Zainoolabdeen, who had been for some years employed by Mr. Frith.

From H. Piddington, Esq. submitting a twenty-fourth Memoir on the Law of Storms.

The Librarian submitted his usual monthly report.

LIBRARY.

The following have been the additions to the Library since the last meeting.

Presented.

A descriptive Catalogue of Bengali works, containing a classified list of fourteen hundred Bengali Books and Pamphlets. By the Rev. J. Long, *Calcutta*, 1855, 12mo.—**BY THE AUTHOR.**

On some species of Amomum, collected in Western Tropical Africa, by Dr. Daniell, by J. D. Hooker. Pamphlet.—**BY THE AUTHOR.**

Introductory Essay to the Flora of New Zealand, by J. D. Hooker, London, 1853, 4to.—**BY THE AUTHOR.**

On the Functions and Structure of the Rostellum of *Listera ovata*, by J. D. Hooker, 4to p.—**BY THE AUTHOR.**

On a new species of Volkamannia, by J. D. Hooker, 8vo. p.—**BY THE AUTHOR.**

Chants Populaires de l'Inde, traduits par M. Garcin de Tassy, *Paris*, 1854, 12l. 8vo. Pamphlet.—**BY THE AUTHOR.**

Selections from the Records of the Government of India, No. VII. Punjab Road Report, Calcutta, 1854, 8vo.—**BY THE GOVERNMENT OF INDIA.**

Selections from the Records of Government of the North Western Provinces. No. XIX.—**BY THE GOVERNMENT, N. W. P.**

Selections from the Records of the Madras Government, No. X. Report on the Operations of the Indian Mints.—**BY THE GOVERNMENT OF MADRAS.**

The Cyclones of the Black Sea, by H. Piddington. *Calcutta*, 1855, 8vo. Pamphlet.—**BY THE AUTHOR.**

On a new method of keeping open the bed of the Ganges, by H. Piddington, Esq., *Calcutta*, 1855, 8vo. Pamphlet.—**BY THE AUTHOR.**

Proceedings of the Royal Society, Vol. VII. Nos. 9,10.—**BY THE SOCIETY.**

The Oriental Christian Spectator for April, 1855.—BY THE EDITOR.

The Oriental Baptist for May, 1855.—BY THE EDITOR.

The Calcutta Christian Observer for May, 1855.—BY THE EDITORS.

Report of the Anjuman Islamy, 8vo. Pamphlet, Persian.—BY THE MAULUVI ABDUL RAUF.

Bibidhártha Sangraha, No. 35.—BY THE EDITOR.

Tattwabodhiní Patriká, No. 112.—BY THE TATTWABODHINÍ SABHA'.

Durbín, a Persian newspaper for April, 1855.—BY THE EDITOR.

Memoirs of the Geological Survey of Great Britain and of the Museum of Economic Geology, *London*, 1854, 3 vols. 8vo.—BY J. H. DELA BECHE.

Records of the School of Mines, Vol. I. p. 2.—BY THE SAME.

Prospectus of the Metropolitan School of Science applied to Mining and the Arts.—BY THE SAME.

Museum of Practical Geology. Industrial Instruction on the Continent, by Lyon Playfair, *London*, 1852, 8vo. p.—BY THE SAME.

Purchased.

The Annals and Magazine of Natural History, Feb. 1855.

RA'JENDRALA'L MITTRA.

JOURNAL
OF THE
ASIATIC SOCIETY.

* No. V.—1855.

*On the Epoch of the Gupta Dynasty.—By E. THOMAS,
Esq., B. C. S.*

In the year 1848, I submitted to the Royal Asiatic Society of London, a Memoir on the Dynasty of the Sáh kings of Sauráshtra. The object I therein proposed to myself, was to test—through the medium of coins, inscriptions and written history—the definite epoch at which the rule of these Princes might most fitly be fixed. In approaching the more specific aim of my enquiry, I had necessarily to examine the dates seemingly most appropriate to certain other races of kings, whose history bore directly or indirectly on the subject under review.

Prominent among these was the family of the Guptas, whose monumental records are extant from the Northward of the Ganges to Guzrát, and whose coins alike indicate a well sustained supremacy, spreading from the Himálayas to the Western coast.

Of the various works put under contribution to elucidate my theme, the most valuable, perhaps, was the “Fragmens Arabes et Persans relatifs à l’Inde” then but newly published by M. Reinaud.

This volume supplied me with several interesting extracts from the original Arabic MS. of Abú Rihán Al Birúní, an author, who had visited India during the reign of Mahmúd of Ghazni. One of the deductions I arrived at on the testimony of the Arabic text was, that the rule of the Guptas, preceded that of the Valabhis—the era of the latter dating from 319 A. D.

This position has been contested by Major A. Cunningham in his book on "the Bhilsa Topes." Now, as the Gupta era, forms a highly important time-mark in the general scheme of Indian history, I may, I think, fairly claim a hearing while examining the question somewhat in detail.

It is a frequent and often deserved reproach against the more determined of the class "Antiquary," that the tendency of such researches is to enlarge the faculty of ingenuity at the expence of comprehensive intelligence. Seldom has been seen a more apt illustration of the justice of this popular accusation, than is afforded in the work just cited. My critic, after a very elaborate collation of minute coincidences—most of them more seeming than real—and an accumulation of a mass of materials, he imagines to be suitable for his purpose—succeeds in raising up a most imposing superstructure, the single fault of which consists in its foundations resting on the veriest sand. Neither can I compliment Major Cunningham on the candour with which he has conducted his cause; he states the bare conclusions I have come to, but usually abstains from informing his readers of the grounds whereon I base my inferences, while his own arguments are paraded in all their exparte advantage.

I must premise, before I proceed to test the value of the criticisms passed on one of my earliest essays, that I neither then was, nor am I now wedded to any particular theory, I should have sincerely rejoiced, if, out of my errors, the truth could have been developed; my speculations—avowedly conjectural in themselves—were put forward with sufficient humility, and therefore I should not consider myself in any way compromised by the subsequent enunciation of any more plausible theory—but, having been attacked, I feel bound to justify myself—with what success it will be for others to decide.

Major Cunningham* opens his argument by objecting to the authority I quote; he first impugns the validity of the statement in

* I reprint almost entire Major Cunningham's case against me, arranging it in detached portions, with a view to bring its various headings, as nearly as may be, into juxtaposition with the opening portions of my replies. I commence my quotations at Ch. XII. par. 1, page 138.

the original text of Al Birúni, and then proceeds to the somewhat bold expedient of proposing a translation, that is to supersede that of M. Reinaud, the Professor of Arabic in the Oriental College of Paris! The latter I shall leave to defend himself, but it is necessary for me to state at once, that *the* amended version is pronounced erroneous by all the Arabic scholars, European and Native to whom I have submitted the passage in question.* But the most unaccount-

"Abu Rihán who in his account of Indian eras, identifies the GUPTA KÁL, or Gupta era, with the BALLABA KÁL, or era of *Balabhi*, which commenced in A. D. 319. These eras are mentioned no less than three times by Abu Rihán; and each time he has identified them as starting from the same date. But it appears to me that the most important of these passages must either be corrupt or obscure, for the translation given by M. Reinaud makes the epoch of the Guptas commence from the date of their extermination! If this is a correct translation, there can be little doubt that the text of Abu Rihán must be erroneous; for we know positively that the Guptas were reigning during the fifth and sixth centuries of our era. But I will venture to suggest a different translation of this important passage, by which the error is got rid of, without any alteration of the text:—[here follows the Arabic text introduced with M. Reinaud's French Translation, page 332]. "With regard to the *Gupta kál* (or era of the Guptas) the name was that of a wicked and powerful family; *whose epoch became extinct with themselves*; and truly Ballaba was after them; for the beginning of their era is the same as (that of) the last (namely) 241 of the SÁKA KÁL."

The underlined passage in the original text is thus translated by M. Reinaud: "et l'ère qui porte leur nom est l'époque de leur extermination;" but the literal translation appears to be, "and then became extinct along with their epoch," which agrees with the version that I have given above.

The statement made in M. Reinaud's version is so extraordinary that, even without any direct proofs of its inaccuracy, I would have set it aside as erroneous. The era of the Seleukidæ began with the foundation of the Syrian empire by Seleukos; the Christian era is dated from the establishment of Christianity; and the era of the Guptas without doubt commenced with the settlement of their own dynasty. For the Guptas, as I have mentioned before, date their inscriptions in an era of their own; which, though not so named by them, was actually a *Gupta kál*, and must, therefore, have been called such by the people.—Bhilsa Topes, p. 140.

* In order to put my readers in possession of the statements of Al Birúni in all their integrity, I append the French Translation of all that refers to the Gupta era, inserting likewise the original Arabic of the disputed passage.

"On emploie ordinairement les ères de Sri-Harscha, de Vikramaditya, de Saca, de Ballaba et des Gouptas. * * L'ère de Saca, nommée par les Indiens Saca-

able portion of the ratiocination advocated by Major Cunningham is that even taking his improved reading, he, in effect, concedes to me all I demand; I assumed from the original passage, that the

kāla, est postérieure à celle de Vikramaditya de 135 ans. Saca est le nom d'un prince qui a régné sur les contrées situées entre l'Indus et la mer. Sa résidence était placée au centre de l'empire, dans la contrée nommée Aryavartha * * Vikramaditya marcha contre lui, mit son armée en déroute et le tua * * Cette époque devint célèbre, à cause de la joie que leu peuples ressentirent de la mort de Saca, et on la choisit pour ère, principalement chez les astronomes.

Ballaba, qui a donné aussi son nom à une ère, était prince de la ville de Ballaba, au midi de Anhalouara, à environ trente yodjanas de distance. L'ère de Ballaba est postérieure à celle de Saca de 241 ans. Pour s'en servir, on pose l'ère de Saca et l'on en ôte à la fois le cube de 6 (216) et le carré de 5, (25). Ce qui reste est l'ère de Ballaba. Il sera question de cette ère eu son lieu."

Before continuing the French translation, I insert the Arabic text of the disputed passage.

واما تاريخ بلب وهو صاحب مدينة بلبه وهي جنوبية عن مدينة انھلوارة
بقریب من ثلثین جوزن فان اوله متاخر عن تاريخ شق بمائتی واحدی واربعین
سنة و مستعملة يضعون شککال وينقصون منه مجموع مكعب الستة ومربع
الخمسة فبقى تاريخ بلب و خبرة آت في موضعه واما كوت کال فكان كما قيل
قوما اشرارا اقوباء فلما انقرضوا ارخ بهم وكان اخيرهم فان اول تاريخهم ايضا
متاخر عن شککال ٢٩١

M. Reinaud's rendering is as follows:—

"Quant au Goupta kāla (ère des Gouptas), ou entend par le mot *goupta* des gens qui, dit-on, étaient méchants et puissants; et l'ère qui porte leur nom est l'époque de leur extermination. Apparemment, Ballaba suivit immédiatement les Gouptas; car l'ère des Gouptas commence aussi l'an 241 de l'ère de Saca. * * D'après cela, en s'en tenant à l'an 460 de l'ère de Zezderdjad, on se trouve sous l'année 1488 de l'ère de Sri-Harscha, l'an 1088 de l'ère de Vikramaditya, l'an 953 de l'ère de Saca, l'an 712 de l'ère de Ballaba et celle des Gouptas. * *

Déjà je me suis excusé sur l'imperfection de ce qui est dit ici, et j'ai averti que les résultats que je présente offraient quelque incertitude, vu les nombres qui excèdent celui de cent. Je ferai remarquer de plus que j'ai vu les Indiens, lorsqu'ils veulent marquer l'année de la prise de Soumenat (par Mahmoud le Ghaznévide), événement qui eut lieu l'an 416 de l'hégire (Janvier 1026 de J. C.), et l'an 947 de

Valabhi era commenced in 319 A. D. and that “the Gupta rule preceded it.” [J. R. A. S. xii. 4.]

The amended translation contains these words “*and truly Ballaba was after them,*” [the Guptas]. What greater support does my argument require than the admission I have italicised? And yet, will it be credited?—on the strength of a sentence admitted to contain the substance of these words, it is unintentionally, but in effect—attempted to establish that the Guptas and the Valabhis were contemporaneous.

Major Cunningham next enters upon certain remarks about eras in general—designing to show that all eras necessarily begin with the rise and not with the fall of a race! and therefore that the era of the Guptas “commenced with the settlement of their own Dynasty.” It is a pity, for the consistency of this view, that regard was not had to the era of Yesdegird, which might well have been brought to the writer’s notice in the very pages of Al Birúní himself, or that, when speaking of Valabhi eras, it was not borne in mind, that the *first* Mahárája of that race did not initiate the family cycle.* But to let this pass, in whatever era the Guptas may date their inscriptions, I should still claim to place the period embraced in all its integrity and completeness before A. D. 319.

Major Cunningham after assuming the employment of a *Special* Gupta Kál goes on to apply it in its details, by constructing a chro-

I’ère de Saca, je les ai vus écrire 242, puis au-dessous 606, puis encore an-dessous 99, enfin additionner le tout ensemble; ce qui donne l’ère de Saca. On peut induire de là que le nombre 242 indique les années qui précèdent l’époque où les Indiens commencèrent à se servir d’un cycle de cent, et que cet usage commença avec l’ère des Guptas. D’après cela, le nombre 606 indiquerait les samvatsaras de cent complets, ce qui porterait chaque samvatsara à 101. Quant au nombre 99, ce seraient les années qui se sont écoulées du samvatsara non encore révolu. C’est ce qui est en effet. J’ai trouvé la confirmation et l’éclaircissement de cela dans les tables astronomiques de Durlab le moutlanien; ou y lit: E’cris 848 et ajoute le Loka-kâla, c’est-à-dire le comput du vulgaire: le produit marquera l’année de l’ère de Saca.” En effet, si nous écirvons l’année de l’ère de Saca qui correspond à l’année actuelle, et qui est l’année 953, et que nous retranchions de ce nombre la quantité 848, il restera 105 pour le Loka-kâla, et l’année de la ruine de Soumenat tombera sur le nombre 98.

* Wathen, J. A. S. B. IV. 481.

nological list of the entire succession. In this he places *Sri Gupta* under Anno Gupta—thereby, in effect, making this individual the prominent founder of the Royal race of Guptas, a position scarcely in accord with the terms in which this person is spoken of in the family records on the Allahabad and Bhitári columns,* or altogether in unison with the modest titles assumed by himself and his immediate successor.† The dynastic inscriptions concede but scant honor to these members of the race and only elevate Chandra Gupta 1st to the dignity of *Mahárájadhirája*.

I now approach the arguments mainly relied on, which are thus urged against me. “The direct evidence of the period when the Guptas flourished is derived from the Chinese. In A. D. 428, the king of Kapila, was named *YUE-gai* or *moon-beloved* which is a synonyme of *CHANDRA GUPTA*, or *moon-cherished*.‡” I am disposed to

* The Rev. W. H. Mill in commenting on the Allahabad Column Inscription, expresses himself as follows. * * But the inscription gives us the names also of the prince and his immediate progenitors: and in accordance with the above-mentioned account, while we find his * * * ancestors, his grandfather and great-grandfather designated only by the honorific epithet *Mahárája*, which would characterize their royal descent and rights—the king himself (*SAMUDRA GUPTA*) and his father are distinguished by the title of *Mahárája Adhirája*, which indicates actual sovereignty. And the last mentioned circumstance might lead some to conjecture, that the restoration of royalty in the house began with the father named Chandra Gupta. J. A. S. B. III. p. 266 [see also Bhitári Lát Inscription, J. A. S., B. VI. p. 6, and Revised Allahabad Inscription, VI. 969].

† Prinsep, [J. A. S., B. V. 645], speaking of a coin of *GHATOT KACHA*, observes in regard to the style of legend adopted by these sovereigns; “to whom, whether from their extra-Indian, or their low origin, or their limited sway, the panegyrist seems to have avoided applying the usual epithets of royalty, *Mahárájadhirája*.”

‡ “Para 3. The direct evidence of the period when the Guptas flourished is derived from the Chinese. In A. D. 428 the king of Kapila was named *Yue gai*, or ‘moon-beloved,’ which is a synonyme of *Chandra Gupta* or ‘moon-cherished.’”

In A. D. 502, the king of India was named *Keu-to* that is *Gupta*, the Páli form of the Sanskrit *Gupta*.

Lastly, Hwán-Thsáng (*Fo-kue-ki*, Appendix) names five princes of Magadha, who flourished previous to the conquest of the country by Síladitya, in the following order:—Lo-kia-lo a-yi-to or *Lagraditya*, Fo-tho-kiu-to or *Buddha Gupta*, Tha-ka-ta-kiu-to or *Takta Gupta*, Pho-lo-a-yi-to or *Baladitya*, Fa-che-lo or *Vajra*.

attach no value whatever to this evidence. The statement referred to runs to the following effect—the kingdom of Kapila is mentioned by *Ma-twan-lin* under the name of *Ka pi li*.—In the article India,

4. Now Siladitya died between 612 and 618 (say in 615) and as he reigned sixty years, his accession must have taken place in A. D. 555; and his conquest of Magadha may be dated about A. D. 600. The chronology of the Guptas as derived from all sources will then stand thus. I. Gupta A. G. 0, A. D. 319. II. Ghatot Kacha A. G., 21, A. D. 340. III. Chandra Gupta 1st, A. G. 41, A. D. 360. IV. Samudra Gupta, *Parakrama*, A. G. 61, A. D. 380. V. Chandra Gupta 2nd, *Vikramaditya*, A. G., 81, A. D. 400. VI. Kumara Gupta, *Mahendra*, A. G. 111, A. D. 430. VII. Skanda Gupta, *Kramaditya*, A. G. 121, A. D. 440. VIII. Skanda Gupta, *Lagraditya* or *Lokaditya*, A. G. 133, A. D. 452. IX. Buddha Gupta, A. G. 161, A. D. 480. X. Takta Gupta, A. G. 191, A. D. 510. XI. Nara Gupta, *Baladitya*, A. G. 221, A. D. 540. XII. Vajra, A. G. 251, A. D. 570. Conquest of Siladitya, A. G. 281, A. D. 600. [Note.] (The dates obtained from various sources are :—for Chandra Gupta Vikramaditya, 82 (Udayagiri Inscription) and 93 (Sanchi Inscription), equivalent to A. D. 401 and 412—from Jain Authorities A. D. 409; and from Chinese Authorities A. D. 428—for Skanda Gupta—his death in 133, or A. D. 452 as stated on the Kuhaon Pillar;—for Buddha Gupta 165, or A. D. 484 as given by the Eran Pillar Inscription).

5. The chronological table has been framed upon the following data. 1st, The power of the Indo-Scythians did not begin to decline until the time of the later Hans in China, whose dynasty was only established in A. D. 222. During the latter half of the third century their power was on the decline, and may be supposed to have been finally overthrown by Gupta in A. D. 319. There are great numbers of gold coins of Indo-Scythian type with corrupt Greek and Indian legends which can only be attributed to this dynasty. 2d. A short inscription of Chandra Gupta, at Udayagiri, is dated in the year 82; and a second of the same prince, at Sanchi, is dated in the year 93. These dates of the Gupta era are equivalent to A. D. 401 and 412, which agree with the Chinese date of A. D. 428 for *Yue-gai* (Prinsep, Journal, VI. 665; Des Guignes I. 45, says A. D. 408). But Chandra Gupta on his coins takes the title of *Vikramaditya* and in the Agni Purana (Prinsep, IV. 688) it is said that *Vikrama*, the son of Gadharupa should ascend the throne of Málawa 753 years after the expiation of Chánakya. This event I have already placed in B. C. 325; from which deducting 753 years, we obtain A. D. 428 for the date of Vikrama of Malwa. Col. Tod also quotes a Jain inscription of Chandra Gupta, dated either in 370 or 409. (Trans. R. A. S. 140, 211) in which he is styled *Avantináth*, or “lord of Ujain,” which was the capital of Malwa. Here then we have a Vikrama and a Chandra Gupta both kings of Malwa at the same time: two statements which can only be recon-

he says: "In the 5th of the years *Yuan-kia*, in the reign of the Emperor *Wen ti* of the *Soung* (428 A. D.), *Yu ai*, king of *Kia pi li* in *Thian-chu*, sent an embassy to the Emperor * * under the Emperor *Ming-ti* of the same dynasty, the second of the years *Thai-ki* (A. D. 466,) *Kia pi li* again sent an ambassador to China bearing tribute. The *Ly-tai-ki-szu* also mentions an embassy from the king of *Kia pi li* in the year 428 of our era."*

The recognition of the existence of a kingdom of Kapila as one of any mark or prominence whatever at or about the periods indicated in the above—is singularly at variance with the facts supplied by both Fa Hian and Huen Tshang. The former in his itinerary speaks of the capital city in these terms. "In this town there are neither king nor people; it is literally a vast solitude. This is the site of the ancient palace of the king *Pe-tsing'* [Sákyá Muni's father] * * "The kingdom of *Kia-wei-lo-wei* [identified as Kapila] is a great solitude; the people are scattered, and white elephants and lions are to be apprehended on the roads."†

Two centuries later Huen Tshang reports the result of his observations to the following effect, "Ce royaume a quatre mille li de tour; on y compte dix villes désertes dont le sol est convert de

ciled by supposing them to be the same person under different names or titles, this supposition is confirmed by the coins of Chandra Gupta, on the reverses of which we find, that he took the titles of Vikrama and Vikramáditya. A cave Inscription at Udayagiri of the Samvat year 1093 or A. D. 1036 couples the name of Chandra Gupta with the kingdom of Vikramaditya (*Vikramaditya Rájyam*). In the Raja Tarangini also it is mentioned that Mátri Gupta was placed on the throne of Kashmir by Vikramaditya, king of Ujain.

According to my corrected chronology of the Raja Tarangini, this happened in A. D. 430. The Satrunjaya Mahatmya (Wilford, Res. As. Soc. IX. 156, and Wilson, ibid. XV. 39 note) also places the 3rd Vikramaditya in Samvat 466, or A. D. 409, From this accumulation of evidence it seems to me certain that a "Chandra Gupta with the title of Vikramaditya was the sovereign of Malwa in the early part of the 5th century of our era."—Bhilsa Topes, pp. 142 to 143.

* I extract this passage from Mr. Laidlay's translation of the *Foe Kone Ki*. I have not the original at command.

† Laidlay's translation, p. 189.

plantes incultes. La capitale est ruinée à un tel point qu'il est impossible de déterminer quelle était son étendue."*

It is absurd to suppose that this capital and kingdom could have been severally re-edified and re-peopled within so brief a space as intervened between the date of Fa Hian's visit, and the epoch alluded to by *Ma-twan-lin*, nor is it probable, if the kingdom had recovered itself to that point of importance in the scale of nations as the Chinese allusions to 428 A. D. and 466 A. D. respectively would imply, that it should have sunk back into such utter desolation in the second Pilgrim's time; on the contrary the tenor of the expressions made use of in the original *Sit-yu-ki* altogether forbids any idea of the kind.† It is far more reasonable to conclude that both the name of the prince, like that of the once flourishing monarchy, should be held to refer to an anterior period to that given by *Ma-touan-lin*, or perhaps with greater justice the whole affair may be put down as an empty and ignorant boast for the honor and glorification of the Chinese monarchs, made in connexion with a site so intimately associated with the early faith of Sákya Muni.

Next in order of Major Cunningham's direct evidences, comes the assertion that "in A. D. 502, the king of India was named *Keu-to* that is Gutto, the Páli form of the Sanskrit Gupta."‡ This statement, be it observed, is also derived from *Ma-twan-lin*, the author whose evidence I have just shewn such reason to distrust—but, under any circumstances, the information conveyed in this quotation is too vague and indistinct to merit much consideration—to make it of any real service in this discussion, it would be necessary to demonstrate, that the name of *Gupta* was special and exclusive with the GUPTA family; whereas the suffix in question was sufficiently common in the ordinary nomenclature of the country. If it had been proposed to assign the appellation to *Sri Gupta*, there

* Huen-Tshang "Julien," p. 126.

† *Sit-yu-ki* liv. VI. folio 7. "Comme ce pays est désert et inhabité depuis bien de siècles, 'on ne rencontre dans les villages que des rares habitants.' Il n'y a ni prince, ni chef supérieur; dans chaque ville, on a établi un maître qui la gouverne."—*Documents Géographiques*, p. 394.

‡ J. A. S. B. VI. p. 65.

might have been more reason in the association ; except, that even Major Cunningham might perhaps be unprepared, either to assert that Sri Gupta was *king of India*, or to modernise his date to so late a period as 502 A. D. !

I now arrive at the crowning point of the Chinese evidence which is thus stated : "lastly Huen Thsang names five princes of Magadha, who flourished previous to the conquest of the country by Siladitya in the following order *Lagraditya, Buddha Gupta, Takta Gupta, Baladitya, Vajra.*" Major Cunningham then proceeds to tack on this list of princes to an imaginary *second Skanda Gupta*, and to argue, that Siladitya, in or about A. D. 600, conquered and superseded the last of these five monarchs : what justification the original text of *Foe-houe-ki* may have afforded, for placing these kings *immediately* prior to Siladitya, I have no means, at this moment, of ascertaining, but, that it has proved a most infelicitous experiment, the now published translation of Huen Thsang's travels too clearly manifests ! So far from the author in question giving any authority for these five monarchs being located in the second half of the 6th century, he absolutely assigns them to a period shortly succeeding the *Nirvana* of Buddha or at about 700 years prior to the date at which he himself visited India ! I transcribe this passage entire in order that there may remain no possible doubt of the justice of my somewhat startling rectification !

"Après le *Nirvâna* du *Buddha*, un ancien roi de ce royaume, nommé Cho-kia-lo-o-tie-to (*Çakraditya*), rempli de respect et d'amour pour le *Bouddha*, construisit à ses frais ce Kia-lan (*Sâmgârâma*).

"Ce roi étant mort, eut pour successeur son fils Fo-to-k'io-to (*Buddhagoupta*), qui, après avoir pris les rênes de ce grand royaume, construisit plus loin, au sud, un autre Kia-lan.

"Un peu plus loin à l'est, son fils, le roi Ta-t'a-kie-to (*Tathâgata*), bâtit un autre couvent.

"Plus loin au nord-est, son fils Polo'ot'ieto (*Bâlditya*) bâtit un autre couvent.

"Dans la suite, voyant qu'un saint religieux venait de la Chine, et se dirigeait vers lui pour recevoir de ses mains les provisions nécessaires, il fut transporté de joie, quitta son trône et embrassa la vie religieuse.

“ Il eut pour successeur son fils Fa-che-lo (*Vadra*), qui, plus loin au nord, construisit un autre couvent.

“ Quelque temps après, un roi de l’ Inde centrale bâtit à côté un autre couvent.

“ De cette manière, six rois, qui montèrent successivement sur le trône, se livrèrent chacun à de pieuses constructions. Le dernier de ces rois entoura tous ces couvents d’une enceinte de murs en briques et les réunit en un seul. pp. 149, 150 * *

* * * Dans le séjour de tous ces hommes vertueux, régnait naturellement des habitudes graves et sévères ; aussi, depuis sept cents ans que ce couvent existe, nul homme n’a jamais enfreint les règles de la discipline.”—p. 152.

Having now shewn how baseless Major Cunningham’s whole fabric is, I need scarcely occupy myself with the adventitious supports with which he designs to give it strength; but it may be instructive to examine his reasoning on these lesser matters, in order that the public may still further judge of the soundness of the conclusions of an antiquarian guide it might otherwise be disposed to rely upon.

First in order of these subordinate aids is placed certain vague information contributed by *Ma-twan-lin*, regarding the power of the Indo-Seythians having survived in India till A. D. 222—even supposing our authority to be trustworthy in the general assertion, we require a much more specific exposition of the geographical limits to be assigned to the Chinese idea of “ *India*,”—we have already seen it used somewhat loosely by this same author, and it is quite in accord with probability that successors of Seythians may have continued to reign in various outlying kingdoms of India or even in isolated portions of India Proper until long after the 3rd century A. D.; I freely adverted to these points in my previous essay, and moreover quoted a curious passage from M. Pauthier, which if borne out—would materially shake all hitherto-received opinions as to the connexion between the Guptas and the Indo-Seythians.

I remarked—“ It is clear that in some divisions of Northern India, the Tochari, or Yuë-Chi, continued to furnish Scythic opponents for the occasional display of heroism on the part of the indigenous monarchs until at least the early portion of the 3rd century

of our era.* The complete decay of the Indo-Scythic empire, whether due on the one hand to successive losses of frontier provinces, or to the less perceptible fusion† of the races of conquerors and conquered on the other, was manifestly a work of time, and apparent traces of the surviving power of the race were to be detected west of the Indus so late as the end of the 4th century.”

But, for reasons already stated—I by no means concur in the supposition that “they were finally overthrown by Gupta,” either in A. D. 319 or that at any time this monarch made any great progress against them. The coins of the dynasty in this respect, bear out the general tendency of the inscriptions—and would lead us to conclude that the more important acquisitions of territory were not made by the Gupta family until the reign of Chandra Gupta 1st, or more decisively under the rule of Samudra Gupta—Ghatot Kacha, though he imitates Scythian devices in his mintages,‡ does not directly adopt their more special type, with the Parvati APΔOKPO

* Note upon Ma-twan-lin, J. A. S. B., vi. 63; also Pauthier, “Thian-tchu,” extract from the Journal Asiatique, 1839, note, p. 9.

† M. Pauthier (Thian-tchu, Journal Asiatique, 1839) notices a curious enquiry, suggested by the similarity of meaning existing between the words Youë chi and Chandra Vansa: subjoined are M. Pauthier’s translation of the Chinese text and his own notes on this head:—

“Dans la Relation des contrées occidentales (*Si-yu*), le royaume du *Thian-tchu* est nommé par quelques-uns *Chin-thou*; et on le dit situé au sud-est des Youë-chi* ou ‘peuple de race lunaire’ à la distance de quelque milliers de *li*. Les mœurs de ses habitants sont les mêmes qui celles des Youë-chi.”† Page 7.

* “*Youë-chi*, mots éthniques qui signifient *de race lunaire*, absolument comme le terme Sanskrit चन्द्र वंश tchandra vansa. Voy. la notice sur ce peuple célèbre (que l’on croit être les Indo-Scythes des historiens occidentaux), que nous avons traduite du Pian-i-tian, liv. LII. art. 2.”

† “*Sou yu youë-chi-thoung*: mores cum (*τοῦ*) *Youë-chi* (moribus) iidem. Quelque extraordinaire que cette assertion paraisse, elle confirmerait le soupçon que nous avons déjà émis ailleurs, que les Youë Chi ou hommes de race lunaire pourraient bien avoir la même origine que les rois Indiens, aussi de race lunaire, Tchandra-vansa.”

May not these coincidences, conjoined to the curious verbal similarity to be detected between NANAIA and NANO, suggest the possibility of the meaning of the latter referring to the moon, and thus PAO NANO PAO being, the King, the Lunar King, or King of the Lunar Race?

‡ J. A. S. B. Vol. V. pl. xxxvi. fig. 12. Ariana Antiqua, pl. xviii. 14.

Reverse,* which, as far as we at present are able to decide, seems to have been first appropriated by Samudra Gupta. The more extended conquests of the house of Gupta do not indeed appear to have been consolidated till the time of Skanda Gupta himself—when the dynastic power may be supposed to have reached its zenith† and thereafter to have suffered decline. We have no immediate means of determining whether Mahendra Gupta‡ was directly succeeded by Buddha Gupta, but it is clear, that under the latter, the extent of the empire had become sensibly diminished.§

Of the miscellaneous items assembled under the second heading in support of the proposed chronological table, I may pass by the inscription dates. I do not contest the term of years indicated by each but seek to discover the era to which the given numbers apply; hence as these figures can in no wise aid in the solution of the difficulty, they scarcely demand further notice in this place.

I now come to the argument wherein it is sought to prove that Chandra Gupta the II. of our list, is identical with *the Vikramaditya* of Malwa of the early part of the 5th century. I can afford to give Major Cunningham a Chandra Gupta and a Vikramaditya for any

* See J. A. S. B. iv. pl. xxxviii. figs. 16 and 17; pl. xxxix. fig. 19; Vol. V. pl. xxxvi. fig. 14, &c. *Ariana Antiqua*, pl. xviii. figs. 6, 7, 8, 9 and 10.

† J. A. S. B. vii. 37 and 348.

‡ As Major Cunningham has taken some liberties with the Gupta succession, I append, for facility of reference, Professor Mill's authoritative list, as given J. A. S. B. vi. 8.

1. Gupta or Sí Gupta (Mahárája).
2. Ghatot Kacha.
3. Chandra Gupta I. (Mahárájadhírája).
4. Samudra Gupta.
5. Chandra Gupta. II.
6. Kumára Gupta.
7. Skanda Gupta.

8. Mahendra Gupta—noticed as a minor in the Bhitári Lát inscription, the name is contributed by coins.

The Erun pillar furnishes us with the name of a 9th prince of this house—*Buddha Gupta*, but the order of his accession is undetermined. See J. A. S. vii. 634.

§ Bhim Sén's pillar at Erun and inscription on temple at Erun.

period of Indian history that he may desire, subsequent to the date of the prominent individuals who made both name and title common in the land, but I am not prepared to concede that sufficient cause has been shown either to authorize Chandra Gupta II. being brought down to the 5th century—or to justify his being converted into a special Vikramaditya. The former point has been already sufficiently discussed, the latter calls for further remark. In the first place I must observe, that in the whole series of the Gupta inscriptions, in which the name of Chandra Gupta II. occurs—in no one instance is that name associated with any such title as Vikramaditya.*

Indeed, in the Sanchi inscription, he is expressly mentioned as being “known among his subjects” by another designation, that “of *Deva rája!*!”†

These very significant facts may have escaped Major Cunningham’s notice, but to indicate—apart from these, how much of special pleading is involved in his argument on this head—I may note, that he relies mainly, for his proof of the *exclusive* right of Chandra Gupta to the honorific title of Vikramaditya—on the occurrence of the words *Sri Vikrama*, &c. on the reverses of some of his coins—altogether ignoring the rather damaging incident, that the full title of Vikramaditya is found also upon the coins of Skanda Gupta.‡

After the concession I have offered above, it will be useless for me to follow the attempted identification, as tested either by the pretended prophecies of the Puranas, by Tod’s very dubious inscription, by the contributions of Jain authorities, or by the shadowy indications afforded by the Rája Tarangini.

In regard to Major Cunningham’s third point,§ i. e. the notice on the Kuhaon pillar of Skanda Gupta’s death—this simply proves

* Bhitári Lát, p. 4, J. A. S. B. vi.; Udayagiri Inscription Bhilsa Topes, p. 151.

† J. A. S. B. vi. p. 456.

‡ J. A. S. B. v. pl. xxxvi, fig. 17; Jour. Roy. As. Soc. xii. pl. iii.

§ “3rd. The date of Skanda Gupta’s death, which is found on the Kuhaon pillar, is the year 133. No era is stated; but it must of course be that era which was used by the ‘royal race of Guptas,’ of which he is said to have been born; and which could only have been the *Gupta kál*, or Gupta era.

His death therefore occurred in $319 + 133 = 452$ A. D. as given in my Table. p. 144.”—Bhilsa Topes, p. 144.

nothing : as I said before, the annual dates need not be contested, it is the cycle to which they belong that continues to be the enigma. But here again the advocate for the modernization of the Guptas seems to have committed himself, inasmuch as he is found assuming Skanda Gupta's death to have taken place in 133 of the year of his dynasty—while the original, from which he quotes, is given by Prinsep as “in the year one hundred and thirty-three *after the decease of Skanda Gupta!**

The fourth† item of data for the chronological table—the Erun pillar record of 165 is merely as valuable as the third!—Buddha Gupta may, in that year of a particular epoch—have erected the commemorative stone, but this in the absence of other evidence no more supports Major Cunningham's position that 165 is equal to A. D. 484, than any other given number would have done.

I am glad to find that there is one point‡ in which Major Cun-

* I do not wish for a moment to conceal the fact that Prinsep's translation of the passage in question is hardly satisfactory ; he himself distrusted it—and if Major Cunningham had made any such observation, I should have concluded that he had obtained a new and improved transcript and translation, but it is probable that if he had done so he would possibly have discovered that the real date is 141 and not 133.

† “4th. The date of Buddha Gupta has been determined by the inscription at Erun, which records the erection of a pillar in the year 165 or A. D. 484. An inspection of the table will show how well this date agrees with the period which must be assigned to Buddha Gupta on the authority of Hwan Thsang ; according to whom *Fo-thokiu-to* or *Buddha Gupta* was the fourth prince prior to Siladitya's conquest of Magadha in A. D. 600. The coins of Buddha Gupta may be seen in pl. ii, figs. 55 and 57, of Mr. Thomas's Essay on the Sah kings of Surashtra, and I can confirm the reading of the legend, which he gives with some hesitation as Buddha Gupta—I procured five of these silver coins from a traveller at Benares, of which I have given away four ; but I still possess sealing-wax impressions of them all, from which I have been able to recognise the engraved specimens.”—*Bhilsa Topes*, p. 144.

‡ “5th. The coins of *NARA GUPTA Báladitya*, are scarce. Of two specimens in gold, that have been in my own possession, I have still impressions ; but the type may be seen in fig. 22, pl. xviii. of Wilson's ‘Ariana Antiqua.’ On the obverse under the Rája's arm is written *Nára* and on the reverse *Báladitya*. The small silver coin fig. 19, pl. xv. of the same work, most probably also belongs to *Nára*. I read the legend :—

ningham is able to support me, that is in the reading of the silver coins of Buddha Gupta.* I could have wished to have been able to compliment him equally on the success of his transcription of the legend of the silver piece, depicted in Ariana Antiqua, pl. xv. fig. 19—which he proposes to assign to Nára Gupta Báladitya; now, as this monarch has proved, as far as the Gupta dynasty are concerned, to be a very ancient myth, I need not seriously contest the point, but I may remark, that I think Major Cunningham would have been wise to have left my reading† of that coin unassailed—I had had the piece under my eye, had transcribed from the original each letter and fragment of a letter—moreover, at the moment of this examination I had before me five other specimens of coins with identical legends, and I then deciphered, as I even now can confirm from my Note-book—the following letters:—

परम भ रज श्रीस्कन्दगुप्त क्रमदित्य

The seven first letters are indubitable, the name of Skanda Gupta is damaged, but quite enough remains of the first and second compound consonants to render their recognition thoroughly satisfactory. The two double letters of the word *Gupta* were only represented by the subjoined न; but, as Major Cunningham also finds Gupta on the coin, I conclude he will not deny me this. The two opening letters of Kramaditya are almost obliterated, but, there can be little doubt about the entire word, which other identical specimens supply in full legibility.‡ The only real difficulties in the conclusive decipherment of the coin were fairly stated by me at the time, to the following effect—"These legends are often imperfect, and very constantly of unequal length, resulting apparently from the amount of room the die-sinker happened to find himself possessed of, as he proceeded with his engraving. Thus in one coin (Wilson A. Art., pl. xv. fig. 19,) the second word [भगवत्] appears to have been contracted into its initial letter, and the three letters

Paramadhi Rája Srí NÁRA GUPTA, Báladitya.

[This seems to conclude all that Major Cunningham has to say on the subject of the Guptas, the subsequent extracts do not form continuous portions of his text.]

* J. R. A. S. B. XII. 70.

† J. R. A. S. XII. 66.

‡ A. A. XV. 16; J. A. S. B. XII. pl. ii. 45 and 46.

that should have succeeded are replaced by two letters serving to express the word राज्." Had I not shewn, in entering into all this detail, that I had fairly examined the *original* piece, there might have been more excuse for Major Cunningham's venturing to correct me on the strength of a mere engraving; which, however well executed—as it certainly is—in its main devices, must necessarily have been expected to prove somewhat imperfect in the expression of the fragmentary letters of a legend, the alphabet of which was unknown to the artist.

I need scarcely advert to the attribution claimed for the gold coin No. 22, pl. xviii. *Ariana Antiqua*.

As I do not, at this moment, propose to do more than notice the Gupta portion of the question as it stands between myself and Major Cunningham, I shall reserve, for a future opportunity, my reply to his proposed rectification of the earlier or Sáh epoch; but, there are two points noticed in the Bhilsa Topes as apropos to that period which may properly be disposed of in this place.

The Gupta inscription on the Allahabad column, in enumerating the conquered and tributary states of Samudra Gupta makes mention of "precious metals brought as tribute by the heaven-descended monarch, the *Sháhán Sháh*, the Scythians, the Huns, &c."* Upon this Major Cunningham proceeds to argue,† that if the Guptas are to date, as Al Birúni would make them, that this reference of Samudra Gupta must be taken to allude to the "Sassanians!" I think the author would have done well to have followed Prinsep in this matter, and to have confined himself to the inference that in this "we have a limit to the *modernity* of our inscription," as suggested by that most excellent archæologist, but I am prepared to contend, that the title of *Sháhán Sháh* is not *peculiar* to the Sassanians, and that if

* J. A. S. B. VI. 979.

† Major Cunningham's words are—"Samudra Gupta according to the Allahabad and Bhitári inscriptions was the fourth prince of the Gupta dynasty; and if we allow twenty years to each reign, Samudra will date from 60 to 80 of the Gupta era, or from 138 to 158 A. D., but in the Allahabad pillar inscription Samudra mentions the *Sháhán Sháh* (that is one of the Sessanian kings of Persia) as his contemporary, whose dynasty did not attain the throne until A. D. 223," * * page 147.

any thing (apart from the present issue) it is more appropriate to the Muluk-i-Towaif, whose head was essentially a king of kings,—the constitution of the Parthian system of government was, that there were “kings in each city,”* and one Suzerain over the whole: who entitled himself ΣΑΤΡΑΠΙΗΣ ΤΩΝ ΣΑΤΡΑΠΩΝ Satrap of Satraps,† ΒΑΣΙΛΕΩΣ ΒΑΣΙΛΕΩΝ,‡ or the Semitic מלכין מלך Malkín Malká,§ as the case might be. The Sassanians imitatively adopted the latter title, without however, continuing the political constitution, which had rendered the designation so peculiarly appropriate. From *Malkán* *Malká*, the later members of the Sassanian dynasty proceeded to خدا Khuda,|| the then current term for King—but neither Sháh nor Sháhán Sháh is ever found on their coins, though that the term existed, we have of course evidence in the name of

* *Tabari*, Persian MS. شاه بادشاهی بود و هر شهری را ملوك طوایف بود.

† Gotarges' Greek inscription at Behistun, quoted by Rawlinson, J. R. A. S. XI. 118.

‡ Coins, J. A. S. B. II. p. 34, &c.

The following early Parthian Monarchs adopt the title of ΒΑΣΙΛΕΩΣ ΒΑΣΙΛΕΩΝ on their coins !

- 1st. Arsaces, VI. Mithridates I. 173 to 136 B.C.
- 2nd. Ditto, XII. Phraates III. 70 to 60 B.C.
- 3rd. Ditto, XIII. Mithridates III. 60 to 54 B.C.
- 4th. Ditto, XIV. Orodes I. 54 to 37 B.C.
- 5th. Ditto, XV. Phraates IV. 37 B.C. to 4 A.D.
- 6th. Ditto, XIX. Artabanus III. 13 to 42 A.D.

The first and second Kings of this list continue however to employ the simple ΒΑΣΙΛΕΩΣ Arsaces XII. likewise styles himself ΒΑΣΙΑΕΤΟΝΤΟΣ ΒΑΣΙΛΕΩΝ. *Ruler of Kings.*

The three Princes noted below take the title of ΘΕΟΠΑΤΟΡΟΣ

- 1st. Arsaces, IV. Phraapatius 196 to 181 B.C.
- 2nd. Ditto, VII. Phrahates II. 136 to 126 B.C.
- 3rd. Ditto, IX. Mithridates II. 123 to 87 B.C.

“View of the coinage of the Parthians,” by John Lindsay, *Cork*, 1852.

§ Coins Num. Chron. XII. 68.

|| See Longperier “Essai sur les Medailles des Rois Perses” coin 47, page 52, coin 48, &c. See also Hamzah Isfaháni, p. 47. خشان ۴۵۷ Regis interfectores Journal Asiatique 1841, pp. 145, 278, ۴۵۸ Livre des rois et Khodáï boum le maître de la terre !

Shahpuhuri شہپوری otherwise written پوھر (سہی پوھر مہری)* and the word is likewise found upon gems, in a position that clearly indicates its *kingly* meaning.†

It is possible that the term had somewhat of a local currency in Kermán, Seistán, &c. as distinguished from the Semitic *Malká*. I must add, however, that the Indo-Sassanian coins still retain the *Malká* in their Pehlaví legends, though the Sanskrit शाहि or पाहि *Sháhi*‡ is also found, in various shades of alphabetical development, on some types of this mixed coinage.§

The only other point I have now to advert to, also very closely concerns the Guptas. Major Cunningham remarks:—"The alphabetical characters of the Saurashtra coins are so widely different from those of the pillar and rock inscriptions, and at the same

* Inscriptions at Nakshi Rustam, and Kermán Sháh. De Sacy and Journal Asiatique, XI. 653.

† Ouseley Medals and Gems (Lon. 1801) J. R. A. S. XIII. 418. J. A. S. B. III. Pl. XXI. 10 and 11, Pl. XXV. 6. A. A. XXI. 22, XXVII. 9.

‡ Had Major Cunningham been better up in his subject, he would have found a tempting argument, in the *Daiva putra Sháhi*, of the Allahabad inscription; which Prinsep erroneously supposed to refer to the Parthians on the strength of the term ΕΚΤΕΝΟΥΣ ΘΕΩΝ, as found in the triple inscriptions at Naksh-i-Rustam (De Sacy Mémoires sur Div. Ant. de la Perse, p. 62, Ker Porter 548); but, Prinsep might have seen from the text itself, that these terms are applied to the Sassanian monarchs *Bábek*, *Ardeshir* and *Sapor*, and have no reference whatever to the *Ardevan*—the last of the Arsacidæ—whose prostrate figure appears in the sculptured group the inscription serves to illustrate. I am not however in a position at this moment, to determine how much of this assumption of godlike descent, by the early Sassanians, may have been derived from their predecessors' style of imperial glorification.

But all discussion on this head is rendered illusory, in the fact, that Prinsep himself confesses, that "the two first letters [दैव] are slightly obliterated, and might be read either *Dábh* or *Dára-putra*. To judge, however, from the author's own facsimile the second letter is far more like a भ *Bh*, than a व *V*; indeed, it differs materially in form from other well ascertained *V*'s in the same line. Nor do I think the proposal to read the second letter as र *R*, one whit more admissible. As for his diphthong, it seems, from his own alphabet, attached to the plate, that this can only be rendered as the vowel o—making the word दोभ, *Dobha*. See J. A. S. B. VI. p. 974.

§ A. A. XVI. 18, XVII. 11, XXI. 20; J. A. S. B. V. pl. iii. 3; J. R. A. S. XII. p. 89.

time are so much similar to those of the Guptas, that it is impossible not to conclude, that there must have been a long interval between Asoka and the independent Sáh kings and an almost immediate succession of the Sáh kings by the Guptas."*

In reply to this, I have only to re-quote in this place, my original authority for an inference to a different effect, leaving my readers to elect the author of the Bhilsa Topes to a higher position as a palaeographer than JAS. PRINSEP, if they so will it. The following extracts from the J. A. S. B. were printed in my paper on the Sáh kings.† "The character [of the Sáh inscription] is only one remove from the Buddhist alphabet of *Girnár*."‡ * * * "The Sanskrit character of the third century B. C. differs only so much from the original form [the Buddhist alphabet of the 5th century B. C.] as the habits of a class of writers distinct in religion and more refined in language, might naturally introduce."§

Prinsep goes on to say "The Asoka alphabet|| (the Sanskrit one) agrees very closely with that of our *Saurashtra* coins, which may thence be pronounced to be anterior to the Gupta series. The *Gujerat* plates dated in the third century of the Samvat era [?], differ but little from the *Allahabad* pillar or *Samudra-Gupta* inscription, but that little is all in favour of their superior antiquity."¶

I conclude that Major Cunningham does not wish to date the Sáh coins at any later epoch than the Sáh inscription, as he must be

* P. 148. † J. R. A. S. XII. 24. ‡ J. A. S. B. VII. 337.

§ J. A. S. B. V. 275. Prinsep, J. A. S. B. VII. 275. The words are as follows: the Sanskrit character of the 3rd century B. C. &c. differs only so much "from the original form as the habits of a class of writers distinct in religion and more refined in language might naturally introduce."

Major Cunningham himself undesignedly concedes much towards this argument in the fact he notices of "the extremely rare use of compound letters" in the Buddhist legends engraved on the Bhilsa Topes. He remarks "only three instances occur throughout all these inscriptions; and they are certainly exceptions to the common practice of Asoka's age, which adhered to the simplest Páli forms." B. F. 268.

|| It may be necessary to remind my readers that Asoka's name occurs in the Sáh inscription—this is the sole instance of its use in inscriptions. In his own edicts he calls himself *Devánampya Piyadasi*, J. A. S. B. VII. 219 et seq.

¶ Ibid, 276.

well aware how much the Numismatic characters of one and the same alphabet are liable to differ from their lapidary equivalents ! So, I will simplify the question by confining myself to the style of writing used upon rocks, stone pillars and copper-plates.

Major Cunningham seems disposed to admit of but one single element, as liable to affect the march of alphabetical development—that of time—but to show how fallacious any notion of a *necessarily* progressive change would be, I may call attention to the very slight modification, that is seen to have taken place in the local alphabets of Guzrát, &c. during ten or eleven centuries—and I would enquire, if his argument is to hold good, how much of difference ought we to be able to detect between the alphabet of the Vallabhi copper-plates, which he would date in the 6th century A. D. and the style of writing in use in the Western Caves, which is almost identical with the characters of the Buddhists of the 5th century B. C. And yet, a reference to Prinsep's facsimiles* will show how essentially limited the alterations effected by this lapse of ages really were ! Jas. Prinsep, as we have seen, was prepared—with his usual frankness—to concede that there were other causes likely to influence these alphabetical mutations—though his original idea had clearly been to assign all impulse in this direction to the effect of time. Had he lived to perfect his theory, I doubt not, that he would have accepted other agencies as playing an important part in the results to be accounted for; prominent among these would, I think, have to be placed the advance or retardation due to nationality or other *local* influences; otherwise it would be difficult indeed to account for the various separate alphabets that we find in all their independent diversity at a later period of Indian progress.†

* J. A. S. B. VII. pl. xiii.

† As my readers may be glad to learn what Al-Birúní says on the state of the varieties of writing current in his day. I append the passage entire.

“ On compte plusieurs écritures dans l’ Inde. La plus répandue est celle qui porte le nom de *siddha-matracā* (سیدھا ماترڪ) ou substance parfaite; elle est usitée dans le Cachemire et à Benarès, qui sont maintenant les deux principaux foyers scientifiques du pays. Ou se sert également de cette écriture dans le Madhya-Deça, appelé aussi du nom d’ Aryavartta. Dans le Malva, on fait usage d’une écriture appelée *nagara* (نگار): celle-ci est disposée de la même manière que la première; mais les formes en sont différentes. Une troisième écriture, nommée

Prinsep's own impression, above quoted, will display how little reliance could be placed on a judgment, which did not take this element into consideration, for he assigns, on the mere ground of forms of letters, a higher antiquity to the Guzrát copper-plates, than he does to the Gupta inscriptions; whereas, we now know, that the Guptas preceded the Vallabhis!

Had he confined himself to tracing the alphabetical advances made by these different sections of Indian races, instead of comparing two series of literal signs that had been thus far matured by different hands, he would have worked upon surer ground. To support my assertion, I would beg attention to the varieties of types of letters to be found on the nearly contemporaneous Gupta inscriptions. If we examine the Allahabad writing* and contrast it with that on the Bhitarî lât,† we discover considerable difference between the general configurations of the majority of the characters in each —varying from scarcely perceptible modifications, to an absolute difference of form in others; for instance, the ख, ग, घ, प and श are virtually the same characters in both inscriptions, but their outlines are by no means identical, while the signs ण, म, व and च are, so to speak, different letters. To carry out the contrast, let us refer to the Bhilsâ‡ inscription. Here again we find a general change in the aspect of the letters and most distinct modification or absolute divergence from the Allahabad type in the following characters—ख, छ, ण, घ, प, भ, म, र, व, श, ष and च. I need not, I imagine, pursue

arḍha-nagary (اردن کوری), c'est-à-dire à moitié nagari, et qui participe des deux premières, est usitée dans le Bhatia (بھاتیہ) et dans une partie du Sind. Parmi les autres écritures, on peut citer le malcâry (صلقاری), usité dans Malcaschêva (ملکشوا), au midi du Sind, près de la côte; le besandiba (بسندب), employé à Bahmanava, ville appelée aussi Mansoura; le karnâta (کرنات), usité dans le Karnate, pays qui donne naissance aux personnes appelée, dans les armées, du nom de Kannara (کنڑا); l'andri, employé dans l'Andra-Deça ou pays d'Andra (اندر دیش); le dravidi, usité dans le Dravida ou Dravira; le lari, dans le Lar-Deça ou pays de Lar; le gaura (کوری), dans le Purab-Deça (پورب دیش) ou région orientale (le Bengale); et le bikchaka (بیکشک) dans le Oudan-Pourahâ-nâka (اودنپورهناک). La dernière écriture est celle dont se servent les bouddhistes (ابد).” M. Rienaud, Mémoire sur l' Inde p. 298.

* J. A. S. B. VI. 969.

† VI. 1.

‡ VI. 455.

this dry subject in greater detail; but, I have some further observations, that I am desirous of offering on the general topic of the early status of Indian systems of writing.

Prinsep has himself suggested the enquiry as to how much of change of alphabetical symbols might be incident upon the use of a more perfect language, as compared with the requirements of the local Páli. Another point of important bearing on the main question, is the probable modification the written or cursive literal signs were subjected to as opposed to the stiff and formal outlines of the characters of the rock inscriptions?

Up to this time, it has been usual to consider the old Páli writing as the basis of all Sanskrit alphabets, we need not contest this inference, but we may fairly enquire, if we have reached the date of the first use of that character, in the epoch assigned to the early Buddhist inscriptions? the reply would reasonably be in the negative! This system of writing, in its sufficiency for all purposes of its own proper linguistic expression, may well have continued for a lengthened period unchanged, as far as inscriptions were concerned, at the same time, that there may have been a progressive advance in the cursive hand, of which we have no immediate record.

We have evidence, in sufficient abundance, to prove that the Eastern nations often availed themselves of a cursive hand, in common with the more formal character reserved for inscriptions. These would each be naturally affected, in the ultimate determination of forms—by the material which had to receive the writing.

Thus the straight wedge-shaped elements of the cuneiform alphabet* were singularly well fitted for easy expression on tablets of Babylonian Clay, and equally suited to rock inscriptions, while the written hand executed only on a smooth surface, presented no difficulties to any series of curves or complicated lines. In addition to leather† and other materials, the ancient Persians, we also learn wrote upon *Tús*‡ (Birch-bark). The Indians we know adapted this

* Layard "Discoveries," &c. 346 and 601, &c. J. B. A. S. XVI. 215.

† Assyria—P. H. Gosse, London, 1832, p. 546.

‡ Hamzæ Ispahání، کتاب تاریخ الامم، p. 961 and xxv. "Libri inventi sunt, in quibus depositæ erant variae eorum discipline, omnes lingua Persica antiqua scripti in cortice tûz." See also Ayin i Akberi, II. 125.

substance to the same uses,* and possibly the Indian Vedas are indebted for their preservation to this very material; whether its employment was limited to the population whose dialects were expressed in the Arian character we have no means of saying, but in all probability, if the Northern Indian races knew of its use, the Magadhis would not have remained long deprived of it or some suitable substitute; that they also wrote with *ink* is amply established by the discovery of letters so written on the relic caskets at Sanchi.†

I imagine it must be conceded, whether on the indications afforded by inscriptions, coins or Buddhist relics, that the ancient Páli or *Magadhi* alphabet had once a very extended currency, and likewise that for a lengthened period it retained its separate identity. It occurs in Asoka's edicts at Delhi,‡ Allahabad, Matia, Bakra, Dhauli and Girnar, its appearance in these several localities§ would, *prima facie*, imply, either that it was intelligible to the people at large throughout the circle embraced within these geographical boundaries, or that it was the recognised sacred alphabet of Buddhism: opposed entirely to the latter supposition is the departure from its use, in the Kapurdigiri text of the edict itself, and the modification the language is seen to have been subjected to in some of the *Páli*

* Masson in A. A. p. 60 and 84. See also fig. 11, pl. iii. Ibid. Masson continues his remarks on substances used to receive writing: "In one or two instances I have met with inscriptions; one scratched with a stylet or sharp-pointed implement around a stactite vase extracted from a Tope at Darunta; another written in ink around an earthen vessel found in a Tope at Hidda; and a third dotted on a brass vessel." See also Reinaud Memo. sur l' Inde, p. 305.

† J. R. A. S. XIII. 110. Bhilsa Topes, 299.

‡ Of the two stone pillars at Delhi, one was moved down from near Khizrabad, at the foot of the Himalayas—the other was taken from Mirat—Jour. Arch. Soc. Delhi, 70, 1850.

§ Other inscriptions in this character occur at—

1. *Sanchi*—J. A. S. B. VI. pl. xxvii. page 461 and VII. pl. lxxiii. 562.

2. *Gya*—Caves, ditto VI. pl. xxxv. Nos. 2 and 3, page 676, these are of the epoch of Dasaratha who followed Suyasa the immediate successor of Asoka!

3. *Cuttack*—Udayagiri Caves, J. A. S. B. VI. pl. liv. p. 1072.

4. *Ibid*—Khandagiri Rock, J. A. S. B. VI. pl. lviii. p. 1080. And we may now add a but slightly modified form of writing as discovered in the Mehenté inscription in Ceylon. J. R. A. S. XIII. 175.

transcripts to meet apparently the local dialects of each site.* On coins, it can scarcely be thought to hold any religious signification, but, the available medallic testimony contributes largely to the inference, that these characters formed the ordinary medium of record in the majority of the states included within the limits above adverted to. In this alphabet exclusively are expressed the legends of numerous series of coins of purely local type,† its characters are found associated on the one part with the Greek of Agathocles and Pantaleon‡ and its phonetic signs are conjoined with counterpart Arian legends on certain classes of the *Bhāt* coins.§ The Buddhist relics do little towards elucidating the expansive spread of this style of writing,|| but—if rightly interpreted—they illustrate in a striking manner the antiquity of its ordinary employment in its even then fixed form.

Another point of view from which this Palaeographic enquiry has to be regarded, is the influence exercised by the conterminous alphabet of Semitic origin—that equally served to express modified forms of the same speech. This character—also claiming the highest antiquity—existed as indigenous South of the Hindū Kush¶ and extended over the Southern base of the Himalaya as far as the Doāb of the Jumna and Ganges. This style of writing, though defective in its Semitic organization, would seem to have found full favour in its day and to have been very extensively employed, as is proved by its extant remains in inscriptions,* on coins, strips of copper, relic cylinders, &c.†

Its currency in India proper is shewn in the legends discovered

* Prinsep towards the conclusion of his review of the various lāt inscriptions observes, “The vernacular language of India at that period, then, varied in different provinces:—it approached more to the Sanskrit in the North-west; diverged from it in *Magadha* and *Kalinga*:—but it was in both places essentially what is now called *Pāṭī*. * * There is no trace of genuine prākṛit in either of the dialects.” VII. 280.

† J. A. S. B. IV. pl. x. and xxxv. and VII. pl. ix. and lxi.

‡ J. A. S. B. V. pl. xxxv. 8 and 9; A. A. VI. 7, 8, 9 and 11.

§ J. A. S. B. VII. pl. xxxii.

|| J. R. A. S. XIII. p. 108. “Bhilsa Topes,” p. 299, &c.

¶ A. A. p. 243. * J. R. A. S. XII. p. 153. † A. A. pl. ii.

in the Tope at Manikyla,* its uniform appearance on the money of the Greek and Scythian dynasties of the Punjab, and its limit Eastward is established by the bilingual Buddhist coins of Behat,† and, if the attribution may be held to stand, by the satrap coins of Hustinapore on the Ganges.‡

Major Cunningham, I understand, proposes to assign these bilingual Behat coins of Kunanda to the period of the nine Nandas : § if this be correct, the Páli alphabet of Northern India must have improved upon the Southern type, and my supposition of an independent advance upon the original form of the alphabet, while the old character was still generally retained, is in a measure confirmed. But, whatever of influence this Bactrian style of writing may once have had upon its contemporary at the point of contact, it was certainly doomed to give way before its more efficient competitor and in but brief space to be no more seen !||

* J. A. S. B. III. 559—Ibid, pls. xxii. and xxxiii.

† J. A. S. B. IV. pl. x. fig. 16 and VII. pl. xxxii. figs. 2, 3 and 4.; A. A. XV. p. 23.

‡ J. A. S. B. new series No. lxx. No. vii. of 1854, page 681.

§ The nine Nandas reigned one hundred years (415 B. C. to 315 B. C. Prinsep, U. T. page 99 !

|| Hwen Thsang who usually gives us very precise information about the language and alphabets of the countries he visited, is silent on the subject of the limit of the Indian alphabet to the Northward. He however, notices that in Oudyâna “ Quoiqu'ils parlent une langue particulière, elle ressemble cependant, eu grande partie, à celle de l' Inde. Les caractères de leur écriture et les usages de la politesse offrent aussi beaucoup de ressemblance (Documens Géographiques, 426). In Bannian, L' écriture, &c. ressemblent à ceux du royaume de Tokhâra ;” (p. 373). Kapissa is represented [it is not clear whether by Hwen Thsang] likewise as using a form of writing but little differing from that of the Tokhâri, but it is added, “ mais les mœurs, la langue parlée et les lois sont fort différentes.” (p. 392). The account of the Tokhâri language given, apparently on the authority of Huen Thsang, though it is to be remarked that he did not visit the capital (p. 464)—is to the following effect! “ Leur langue parlée diffère peu de celle des autres royaumes ; les caractères primitifs de leur écriture se composent de vingt-cinq signes qui se multiplient eu se combinant ensemble et servent à exprimer toutes choses. Ils ecrivent horizontalement de gauche à droite.” (p. 455).

*A Twenty-fourth Memoir on the Law of Storms, being the CALCUTTA
AND SUNDERBUND CYCLONE of 14th and 15th May, 1852.—By
HENRY PIDDINGTON, President of Marine Courts.*

I have named this the SUNDERBUND CYCLONE, because it is a remarkable instance of a Cyclone passing up through the Sunderbunds, thirty-nine miles to the East of Calcutta, where its fury was terrific, and because of our having fortunately been able to obtain through the Logs of two inland Steamers, and the notes of a gentleman residing at a Salt Agency on the verge of the Sunderbunds excellent data for its track there; while farther to the Northward through Jessore and Bogorah into Assam, very good notes also enable us to follow it to its termination, probably into the mountains of Bootan. The Sunderbund documents are by far the most wonderful and interesting accounts of what occurs at the centre of a Cyclone of any yet published, and with the report from Cuttack, copied from the *Bombay Times* go far to establish my theory of the Electric origin of these wonderful meteors.

Beginning with the observations from the Southward, we have the following:

At Madras.

Capt. Biden on the 11th May, in a newspaper notice addressed to the Editor of the *Madras Circulator*, after commenting generally on the uncertain state of the weather at the times of the change of the Monsoon, and the perilous state of the shipping in Madras Roads when gales or Cyclones suddenly set in, says:—

“A severe gust of wind between 2 and 3 A. M. this day from N. W. to N. N. E., with lightning from the N. E. together with an irregular action of the Barometer, shews the necessity of the shipping being well prepared to encounter bad weather; fortunately the sea was smooth, and the Ships and Native Craft held fast, but such a sudden change, and from so suspicious a quarter, should serve as a warning.

* * * * *

“The Barometer has been very unsteady within the last forty-eight hours, and it fell yesterday from $29^{\circ} 87'$ at 8 A. M., to $29^{\circ} 76.$ at 4 P. M., and this morning I learn from the Observatory that the

Barometer is irregular, as it rose a little from midnight to 5 A. M., when it should have been falling, and has been falling ever since, when it should have been rising. We may therefore consider the weather as somewhat suspicious, but the Sea continues remarkably smooth and the surf is moderate; however for the purpose of inducing all due care and precaution I have made the signal—‘ Weather is suspicious.’”

Ship ENEAS, Capt. WRIGHT, from the Mauritius to Calcutta.

Wednesday, 11th May, 1852.—Lat. 9° 28' North; Long. 84° 4' East; Bar.* 29.89; Symp. 28.80; Aneroid 29.74; Ther. 85°. Wind shifted from S. W., thick squally weather, to W. b. N.; fresh breeze and cloudy to the Westward over the land; at night much lightning, not so much during the day, overcast appearance passing fast to the Northward.

12th.—Lat. 12° 39' N.; Long. 84° 40' E.; Bar. 29.85; Symp. 29.80; Aneroid 29.75; Ther. 87°. Wind between West and N. W. W. fresh breeze with a peculiar white overcast appearance, but fine; sun and stars visible at intervals.

13th.—Lat. 15° 38' N.; Long. 85° 42' East; Bar. 29.75; Symp. 29.72; Aneroid 29.65; Ther. 87°. Wind variable between W. b. S. and W. N. W. overcast, sun obscured, swell Westerly,† much lightning all round, particularly to S. E. Easterly, and a thick squally appearance in that direction which passed to North, several stars seen during the night.

14th.—Lat. 17° 49' North; Long. 87° 5' East; Bar. A. M. 29.62; P. M. 29.55; Symp. 29.66; P. M. 29.55; Aneroid A. M. 29.55; P. M. 29.45; Ther. 85°. These observations were taken at 10 A. M. and 10 P. M.; at 9 P. M. felt a short sea from N. Eastward for the first time, scarcely perceptible; the upper dense clouds appeared to move very slow to North or N. b. W. the lower clouds with the wind; stood on our course till 1h. A. M.

15th.—Sea increasing very fast, ship running at nine miles per hour overcast appearance more dense and black, stars seen at intervals, wind between W. b. N. to N. W. variable. Judging from the whole being so steady between W. b. N. and N. W. all the way up from Ceylon, more from W. N. W. than N. W. that the Cyclone was making a Northerly course and my Bar. not being very low, that it was some distance from me, I stood to East Southerly about sixty miles. At 1 A. M. on the 15th, sea increasing very much; during this time much lightning all round, com-

* Observations made at 10 A. M.

† Is this a swell to the West or from the West?

monly called sheet lightning,* my reasons for standing to Eastward were, in case the Cyclone should recurve and take a course in the direction of the Coast to Ganjam; or otherwise if broken up at the Sandheads I might experience heavy shifts of wind near False Point.

15th.—Bar. 29.73; Symp. 29.73; Aneroid 29.63; Ther. 86°; weather-glasses scarcely falling at the usual time. Weather fine, wind between S. W. and South, sea very high from Westward until in soundings, where it entirely disappeared; a very strong haze and high Southerly sea nearly resembling rollers; the haze so strong that I could not see the pilot vessel till close to her, say three miles, (although on board the pilot vessel they had seen us an hour previous). As all hands were anxiously looking out for her, I conclude the haze was much stronger to the Northward than to the Southward.

*Abridged Extract from the Log of the Barque LIMEHOUSE,
Capt. CHESTER, from the Cape to Calcutta.—Civil Time.*

13th May, 1852.—Strong breeze W. N. W. Daylight showery and heavy head swell, ship plunging very deep. Noon Lat. p. n. 16° 42' N.; Long. 86° 36' East; Bar. corrected 29.785; Ther. 82°. p. m. wind West, ship running to the Northward. Fresh gales increasing to midnight, when blowing very heavy.

14th.—2 a. m. blowing a heavy gale West, and terrific squalls. Hove to. 5 a. m. wind marked S. W.; 6 a. m. bore up, heavy cross seas breaking over the ship like a half-tide rock. Noon Lat. 17° 9' North; Long. 86° 20' East; Bar. cor. 29.685; Ther. 82°; Simp. 29.30. p. m. very threatening, making all snug; wind W. S. W. Bar. 29.55; at 7h. 30'; p. m. Ther 80°; 8 p. m. under close reefs; wind West, fresh gale. *The sky in a perfect blaze with lightning all round the compass. At 9h. 30' lightning particularly vivid in the N. W. quarter with rain. At 8 p. m. sounded; no ground 70 fs.; at 10 p. m. tremendous heavy squalls. Hove to. Wind marked N. West to West; Bar. 29.45; Ther. 79°; Simp. 29.10. Midnight blowing a very heavy gale; wind W. b. S.*

15th.—Deluge of rain to 2 a. m. Thunder and lightning still heavy. Barometer rising and falling to the weather (extent of variation is not given). At 4 a. m. it suddenly fell nearly calm and in about five minutes it blew a hurricane harder than before. Many clouds full of electricity, sky appearing one mass of fire. Wind S. W.; 8 a. m. S. W. b. W. and

* During the day and night several flashes of forked lightning were observed.

† The italics are mine: this is a notable instance of lightning in the rear of a Cyclone.—H. P.

Noon S. W. Bore up at 8 A. M.; sea very confused and "in eddies." Noon Lat. $17^{\circ} 59'$ North; Long. $87^{\circ} 22'$ East; Bar. 29.83; Ther. 83° ; Simp. 29.30. Weather much more settled.

Abridged extract from the Log of the Ship AMAZON, Captain Coote, from Adelaide to Calcutta—reduced to Civil Time.

At Noon 12th May, 1853.—Lat. $16^{\circ} 41'$ N.; Long. $85^{\circ} 07'$ East; Bar. 29.68; Simp. 29.54; Ther. 88° . Moderate and fine. Wind W. N. W.; at 4, N. W.; Sunset threatening. Confused swell getting up. At 8 P. M. Bar. 29.65; Midnight, wind North, fresh and hazy, Bar. 29.65.

13th.—A. M. wind N. N. W. gloomy, 4h. the same; Ther. 85° ; Symp. 29.40; Bar. 29.57; 6h. moderate breeze from the N. N. W. with dark gloomy weather, making preparations for bad weather; 10h. increasing from the N. N. W. with torrents of rain; close-reefed. Up to Noon strong breezes from the N. W. with thick rainy weather and high tumbling sea, Lat. Acct. $17^{\circ} 21'$ N.; Long. $85^{\circ} 49'$ E.; Ther. 85° ; Symp. 29.42; Bar. 29.57; P. M. increasing wind with torrents of rain from W. N. W.; 1h. Ther. 85° ; Symp. 29.40; Bar. 29.57. The squalls come on with terrific violence with torrents of rain and confused sea. As we have no doubt but that there is a hurricane to the northward of us and the squalls come with such excessive violence we were afraid of being too near the centre, so keep her away E. S. E. under close-reefed fore and main topsail and reefed foresail. 2h. wind West, squalls terrific (hot and cold like the Scirocco, says Capt. Coote) sometimes the rain would be quite warm and at other times almost freezing; Ther. $82\frac{1}{2}$; Symp. 29.34; Bar. 29.47; 3h. Ther. $82\frac{1}{2}$; Symp. 29.30; Bar. 29.40. Wind West, blowing with terrific violence which obliges us to take in the foresail and fore topsail; passed a large Brig, dismasted, lying to on port tack; 4h. wind West, Ther. 83° ; Symp. 29.30; Bar. 29.40; 5h. Ther. 83° ; Symp. 29.30; Bar. 40. Wind W. b. S. blowing dreadfully hard, which obliges us to keep her right before it, but she behaves well and steers beautifully. The sky appears quite red from West to South; 6h. Ther. 83° ; Symp. 29.28; Bar. 29.40. Wind W. b. S.; snaked lightning in the N. E., kept away S. E. by S. the wind inclining to Southern. Sea very high and uneven; 7h. Ther. 83° ; Symp. 29.31; Bar. 29.44, wind W. S. W. the squalls come with unabated fury; 8h. Ther. 83° ; Symp. 29.32; Bar. 29.44. Wind W. S. W. 10h. Ther. $83\frac{1}{2}$; Symp. 29.38; Bar. 29.50. Blowing terrifically, but sea more regular; Midnight Ther. 84° ; Symp. 29.56; Bar. 29.48. Wind S. W. in fearful gusts, roaring like thunder. Flash lightning all round the horizon, wore ship and laid to with head to the Northward.

14th.—Up to 4 A. M. a heavy gale from the S. W. with fearful sea ; Ther. $85\frac{1}{2}$ °; Symp. 29.40; Bar. 29.51. At 6 A. M. more moderate, wind S. W. very red appearance in the Eastward ; 7h. a terrific squall coming up *which appears like a cloud of brick-dust.* Took in fore topsail. But before we could get the main topsail in it was up to us, and with such terrific violence that we were obliged to keep her right before it, as if it had struck her on the broad side nothing could have saved her. Managed to get the main topsail in. When right before the squall her masts bent like willows. In fact I thought nothing could have saved them. It blew with terrific violence until 10, when it moderated a little, but the wind is still West up to Noon, strong squalls with constant rain. Sea very much confused with snaked lightning in the East. Lat. $17^{\circ} 00'$; by 2 Alt. $16^{\circ} 50' N.$; Long. $87^{\circ} 13' E$ by Chr.; Ther. 82° ; Symp. 29.56; Bar. 29.64. P. M. heavy squalls, wind W. S. W. kept her away N. E. under easy sail ; 4h. squalls very much diminished, wind S. W. *I counted thirteen whirlwinds all in sight at one time and as high as my main mainmast. There was one passed close to me and it left a very troubled wake. They appeared to blow with terrific violence.*

Ship FAIRFIELD of Liverpool, Capt. HORNELL, towards Calcutta.

13th May.—Noon Lat. 11.39 . Strong breeze and gloomy weather from S. W. and N. W. Ship standing to N. b. W. and N. N. W.

14th May, 1852.—Noon Lat. 15.08 ; fresh breeze S. W. and cloudy weather with much lightning. Ship standing to N. N. W.

15th May.—Gloomy weather and steady strong breezes from S. W. 5 p. m. Ganjam Flag Staff N. W. b. W. 8 miles. Ship running along shore from 6 p. m.

Abridged Extract from the Log of the Ship "LONDON," Capt. H. O'NEILL, from Akyab to London—reduced to Civil Time.

This unfortunate ship left Akyab bound to London with a cargo of rice on the 8th May, and on the 11th at Noon she was in Lat. $18^{\circ} 12' N.$ Long. $91^{\circ} 28' E$, with S. S. W. and S. W. winds; and on the 12th May, A. M. had fresh breezes and squally weather from W. S. W. to S. E. and N. East. Ship steering to the S. W. being at Noon in Lat. $16^{\circ} 40' N.$; Long. $90^{\circ} 00' E$, going $8\frac{1}{2}$ knots. Wind and sea increasing rapidly from Noon. Wind marked N. East at 4 p. m. and North at 11.6 p. m. Heavy gale with violent squalls of wind, rain, *thunder and lightning.** Tremendous sea rising and ship making bad weather. Hove to

* Italics are mine.—H. P.

on larboard tack; wind veering to the Northward and N. W. Barometer steady on the 10th, 11th and 12th, at 29.48, but when the hurricane commenced, it fell gradually to 28.50, and stood at that point for four hours. At 10h. 30' p. m. a complete hurricane to midnight.

13th May.—At 2h. 30' a. m. lost mizen mast and head of main mast; wreck of the mizen mast getting under the ship's bottom; 4 a. m. Wind marked N. W. and at 9 a. m. West. Cut away the main mast which disabled one pump and injured another.* At 11 a. m. Wind is marked W. S. W. Hurricane still continuing and the ship in the utmost distress; p. m. Rudder head split; 2 p. m. Pumps choked with rice. Throwing cargo overboard. Found channel bolts and planks started and rent. Hurricane to midnight.

14th May.—4 a. m. more moderate, cargo heating and steaming, rudder useless; 10 feet water in the hold and excessively hot. Noon Lat. D. R. 16° 41' N.; Long. 89° 40' East. Crew unable to stand the heat of the water and steam.

16th May.—Ship settling fast, pumps choked, and crew completely exhausted. At 3.38 p. m. abandoned the ship in the longboat. Lat. at Noon 17° 35' North; Long. 90° 40' East. Fresh breezes from S. W.

*Abridged Extracts from the Log of the ADELAIDE, Capt. STEPHENS,
from Adelaide to Calcutta—Civil Time.*

13th May, 1852.—a. m. Calm. At 10, increasing breeze and a head swell on, ship standing E. b. N. Wind marked North. Noon Lat. 19° 27' N.; Long. 86° 15' East. 2 p. m. stormy, wind increasing to a gale with heavy swell from the Eastward; 6 p. m. severe gale; close reefs. Increasing sea as before; 8, heavy gale and stormy gusts; 8 p. m. made all snug and put the helm up to run out of the limits of the hurricane. At 10, Wind N. N. W. and at Midnight N. W. b. W. Running to S. b. E. to Midnight. Barometer and Sympiesometer as follows:

Bar. Symp. and Ther. May 13th, 1852.

	Bar.	Symp.	Ther. a. m.
12h	29.57	29.25	86°
1 p. m.	00.00	00.00	0
2	29.50	29.17	85
3	29.47	29.15	85
4	29.45	29.12	85
5	29.38	29.12	85
6	29.44	29.10	85

* The liability to this accident I have already pointed out elsewhere, but it cannot be too often urged upon owners, builders, and seamen.—H. P.

7	29.38	29.10	85
8	29.40	29.10	85
9	29.38	29.05	85
10	29.43	29.10	85
11	29.45	29.10	84
12	29.39	29.10	84

Although there appears to be a great variation in the readings of the Barometer, it is perfectly correct, as I was particular in taking it myself every hour of the gale.

D. H. STEPHENS.

May 14th.—A. m. wind N. W. b. W. Tremendous heavy gale; running under close-reefed main topsail and fore-topmast staysail. At 4 A. M. having run 48 miles to the S. b. E., S. E. b. S. and S. East, hove to with wind at N. W.; 5 A. M. wind W. N. W.; 9 A. M. West Noon Lat. $18^{\circ} 45'$ N.; Long. $87^{\circ} 23'$ East. P. M. hard gale; midnight hard gale with a great deal of lightning and thunder.

Table of the Instruments and Remarks for the 14th May.

	Bar.	Symp.	Ther.	Remarks 14th of May.
1 A. M.	29.34	29.2	83	Heavy gale, A. M.
2	29.32	29.5	81	
3	29.28	29.2	80	
4	29.12	28.97	80	
5	29.15	29.2	81	
6	29.27	29.7	81	
7	29.28	29.10	81	
8	29.32	29.12	81	
9	29.37	29.15	81	
10	29.37	29.15	81	
11	29.30	29.5	81	
12 Noon	29.34	29.00	81	
1	29.38	29.5	81	
2	29.40	29.10	82	
3	..	..	..
4	..	..	..
5	..	..	..
6	..	..	..
7	29.41	29.12	83	
8	29.47	29.20	84	
9	29.48	29.22	83	
10	..	..	..
11	..	..	..
12	29.48	29.25	83	

As the wind shifted in much more curious and greater regularity than is marked in the ship's Log, which was not written up till noon of this day, and being on deck myself, with the exception of a few minutes each hour, to note my glasses and make my remarks, I give a short statement of the actual winds and courses 9 P. M. 13th until 4 A. M. 14th.

	<i>Wind.</i>	<i>Course.</i>
9 to 10 p. m. 13th	N. b. E.	S. b. W. hard gale.
11	North.	South ditto ditto and heavy rain.
12	N. b. W.	S. b. East heavy gust with moderate rain at 4, hove to on Port tack.
1 a. m. 14th	N. N. W.	S. S. East ditto with much lightning to the N. W.
2	N. W. b. W.	S. E. b. S. ditto ditto ditto.
3	N. West.	S. East.
4	N. W. b. W.	S. E. b. E.

15th May.—Wind S. W. and decreasing gale to Noon when stormy breeze and clear. Lat. $19^{\circ} 27' N.$; Long. Acct. $87^{\circ} 12' E.$ Bar. at 8 a. m. 29.50; Noon 29.58. A set of 40 miles to the W. b. N. from Noon of the 13th, supposed to be occasioned by the Cyclone.

*Abridged Extract from the Log of the P. and O. Steam Ship
PRECURSOR, Capt. A. GRIFFIN—Civil Time.*

13th May, 1852.—A. m. moderate breezes with occasional heavy squalls from the Southward, weather looking unsettled. Noon Lat. $15^{\circ} 28'$; Long. $83^{\circ} 01'$; 6 p. m. Bar. 29.68; Symp. 29.48; Ther. 88° . Heavy dull-looking weather with leaden appearance. Wind falling light and hauling round to the Northward and N. Eastward. Not liking the look of the weather, took in and furled all sail, made preparations for bad weather by securing every thing on deck with extra lashings, &c. Slight swell from Northward, 7.30 p. m. Bar. 29.74; Symp. 29.44; Aneroid 29.64; Ther. 87° . Gloomy looking weather, a few stars visible to the Eastward and Westward. Wind very light from N. Eastward, every thing snug before night.

9.30 p. m. Bar. 29.74; Symp. 29.48; Aneroid 29.67; Ther. 85° . Moderate Easterly breeze, weather looking much clearer. Stars bright overhead, and to within 16 or 18 of the horizon, where they were obscured by a bank.

11 p. m. Bar. 29.70; Symp. 29.55; Aneroid 29.65; Ther. 84° . Clear overhead, hazy about the horizon. Wind moderate from S. Eastward. Stars steadily bright. Steering to the N. Eastward.

14th May.—3 a. m. Bar. 29.65; Symp. 29.50; Aneroid 29.56; Ther. 87° . Light breeze from N. Eastward. A head swell rising. Very squally appearance from North to E. N. E. with lightning. Stars visible to the Southward. Steering to the N. Eastward.

4 a. m. Bar. 29.63 ; Symp. 29.45 ; Aneroid 29.56 ; Ther. 87°. Squally dark appearance from N. W. to S. E. by the North with heavy increasing swell from N. Eastward, thunder and lightning. Rigged in the jibboom and housed the fore-topmast. Wind very light and variable. *Reduced our speed to about 4½ knots, to avoid running into bad weather, which I felt sure existed to the Northward.**

5 a. m. Bar. 29.63 ; Symp. 29.50 ; Aneroid 29.57 ; Ther. 88°. Shortly after 4, a light breeze sprung up from S. W. which lasted for about an hour. Wind now very light and variable. A heavy bank forming to the Northward. Lightning very low, but not very vivid. Swell very heavy and increasing from N. Eastward. Engines going very slow. Steering N. E.

6.30 a. m. Bar. 29.65 ; Symp. 29.45 ; Aneroid 29.58 ; Ther. 84°. Wind light from Northward, detached clouds overhead with no apparent motion. Heavy appearance all round the horizon particularly to the Southward. A very heavy sluggish swell from N. E. Steering E. N. E. and going quite slow.

8 a. m. Bar. 29.69 ; Symp. 29.57 ; Aneroid 29.66 ; Ther. 84°. Light N. Easterly airs. Swell still from N. E., if any thing, decreasing, sky more uniformly dark, but not looking so threatening. Steering N. E.

9.30 a. m. Bar. 29.74 ; Symp. 29.60 ; Aneroid 29.63 ; Ther. 85°. Moderate wind from S. Westward. Clouds appear more broken. N. Easterly swell very high, and toppling over to the Northward. Went on again full speed. Steering N. E. Saw a Paria sloop to the N. Westward. standing to the Eastward under all sail.

10.30 a. m. Bar. 29.70 ; Symp. 29.58 ; Aneroid 29.63 ; Ther. 85°. Moderate S. Westerly winds with detached clouds, weather altogether appearing much finer. N. Easterly swell still very heavy, but regular; ship diving deeply at times. Wind rather inclining to the Southward.

Noon. Bar. 29.65 ; Symp. 29.50 ; Aneroid 29.57 ; Ther. 87°. Moderate S. Westerly wind and much clearer weather. Very heavy N. Easterly swell toppling over to the Northward. Sun visible at times Lat. 17° 46' N. ; Long. Acct. 84° 48' E. The ship pitching heavily.

3.30 p. m. Bar. 29.63 ; Symp. 29.45 ; Aneroid 29.55 ; Ther. 86°. Since 1 p. m. moderate Westerly breeze and cloudy thick weather. Heavy swell from N. E. not so regular, light rain.

7 p. m. squall of rain from N. West with lightning.

7.30 p. m. ditto ditto ditto.

8 p. m. Bar. 29.65 ; Symp. 29.50 ; Aneroid 29.63 ; Ther. 87°. Dark clouds passing over from N. W. Dark threatening appearance to the S.

* Italics are mine.—H. P.

Eastward. Vivid lightning to the Northward and Southward. Wind light from Northward and Westward. Swell rather decreasing. Ship pitching very heavily, occasionally a few stars visible. Steering N. E. by N. got a glimpse of the planet Venus, which gave us a Longitude $86^{\circ} 30'$. This worked back to Noon, gives a set to the Eastward of 65 miles from the previous Noon !

9 p. m. Bar. 29.70 ; Symp. 29.54 ; Aneroid 29.64 ; Ther. 85° . A tremendous squall struck us from the N. W. with heavy rain. It veered to West and S. W. blowing very hard, lightning very vivid, and sky all round as black as ink. Thinking it possible that *this might be the first breeze of a Cyclone, I put the ship's head to the Southward and reduced speed to about 6 knots.** Observed a small meteor playing about the main top-gallant mast head which disappeared in a few minutes.

10 p. m. Bar. 29.70 ; Symp. 29.54 ; Aneroid 29.64 ; Ther. 85° . Dark threatening appearance. Wind moderating at S. W. Midnight very vivid lightning to the Southward with black threatening appearance. Wind from S. W. and S. S. W. blowing a fresh gale at times with rain. Barometers, &c. pretty stationary, still steering South and going slow.

15th May.—A. m. Bar. 29.70 ; Symp. 29.60 ; Aneroid 29.63 ; Ther. 84° . Dark angry appearance all round. Strong S. S. Westerly wind with rain, much less sea and swell, lightning less vivid. Put the ship's head round to N. Eastward again, going quite slow.

6 a. m. Bar. 29.71 ; Symp. 29.63 ; Aneroid 29.65 ; Ther. 85° . Gloomy looking weather with moderate S. Westerly breeze. Swell moderate from S. Eastward. Weather appearing more settled. Went on full speed for the Pilot's Ridge Station.

8, Bar. 29.68 ; Symp. 29.61 ; Aneroid .29 ; Ther. 84° . Noon Bar. 29.75 ; Symp. 29.62 ; Ther. 86° . Lat. $19^{\circ} 31' N.$; Long. $87^{\circ} 10'$; Pilot's Ridge Station N. $12^{\circ} E. 84'$.

American Ship ANGELO.

This ship was on the 12th May, in Lat. $13^{\circ} 37' N.$; Long. $82^{\circ} 3' E.$, and on the 15th, in $18^{\circ} 39' N.$; Long. $86^{\circ} 2' E.$ with variable winds from W. to S. East and S. W. a long heavy S. W. swell all day, is the only remark on the 15th, and this continues on the 16th. The Captain observed very threatening appearances to the N. East on the 14th, when in Lat. $17^{\circ} 12' N.$; $84^{\circ} 10' E.$; (Bar. fallen to 29.65 from 29.80 on the 13th,) but the sickness on board prevented him from making notes.

* Italics are mine.—H. P.

Report from Mr. W. BARCKLEY, Superintendent of False Point Light House.

On the 13th and 14th May, 1852.—False Point was visited with a heavy gale. On Thursday the 13th, at 2 p. m. we had a heavy squall from the N. E. the wind being in the forenoon from East; it continued squally with a low cross scud, one from the S. E. and another from S. W. with a falling Barometer until midnight, with the wind from North; when it settled in a steady gale from N. W. with heavy rain, and distant thunder, but no lightning, the gale continued steady from N. W. until Noon of Friday the 14th, when the wind changed to North, and at 5 p. m. veered round to S. E. At 6 p. m. the gale broke with the wind at S. S. E. the Barometer was at its lowest at 5 p. m. when it stood at 29.38. After that the Barometer was on the rise. There seemed to be a confused sea on, out to sea-ward, and a very heavy break upon the beach. I am happy to say there was no damage sustained at or near the Light House during the gale.

I have the honour to enclose a Statement of the Barometer during the gale.

State of Barometer and Thermometer, on the 13th and 14th May, 1852, at the Light House on False Point Palmiras.

MAY 13TH.

Hours.	Barometer.	Thermometer.	Wind.
8 A. M.	29.70	84.0	East.
10 "	..	85.0	
Noon.	..	86.0	N. E.
2 P. M.	29.65	..	"
4 "	29.62	..	
5 "	29.60	85.0	North.
6 "	29.60	84.0	"
8 "	29.55	83.0	
Midnight.	29.55	82.0	N. W.

MAY 14TH.

2 A. M.	29.52	80.0	N. W.
4 "	29.50	..	"
6 "	..	81.0	"
8 "	..	82.30	"
10 "	..	84.0	"
Noon.	..	..	North.
2 P. M.	29.45	..	"
4 "	29.40	83.0	
5 "	29.38	..	S. E.
6 "	29.40	82.0	S. S. E.
8 "	29.45	80.0	
Midnight.	29.50	80.0	West.

Station of CUTTACK; Extract from the Bombay Times.

"Cuttack, 9th June, 1852.—I see by the "Bombay Times" that there has been very extraordinary weather throughout almost the whole of India. I can say for Cuttack this year that it has been the same here, and every person who has known the place for some time, remarks that it was quite unusual. We have had constant thunder-storms, attended with frequent and heavy rains, and the Barometer has been constantly oscillating, thus showing frequent breaks and irregularities in the upper currents. The wind has always had a great deal of southing in it, and has influenced the weather as to moistness accordingly. Damp hot winds like those from a vapour-bath have been very prevalent, and tatties and cooling the air are quite out of the question whilst these hold sway. The vapour percentage for March, an unusually dry month generally speaking, was as high this one as 64. We had consequently many days on which there were thunder-storms, attended sometimes with slight, but frequently with very heavy rain; the wind held firmly to the S. and S. S. W. quarter, and the air was humid in the extreme. In April the air was drier, the vapour percentage fell to 55, but in it there were many days of rain, although it was never so heavy as in the last month. The winds were Southward before. In May the vapour percentage for the first 10 days was 67.7. Mean of the Barometer, corrected for Temperature, and surface of Mercury in tube, but not for level, 29.584; Mean of Thermometer 87.9; and rain in inches 1.83. For the second ten days, the vapour percentage reached 70, Mean of Barometer 29.543, of Thermometer, in N. N. E. verandah well protected from radiation 87.6. For the whole month, Mean of Barometer 29.585, Thermometer 88.9, Dew-point 74.1, Vapour percentage 62, rain in inches 3.25. The winds were S. W. 57, West 2, South 18, S. East 21, North 2, N. East 21, N. West 14, East 1, total 136. I mean by S. W. all winds that blow between the points of S. and West. Thus giving 43 of East winds, 73 of West winds, 37 of North winds, 96 of South. North winds are to South as 1 to 2.59, East to West as 1 to 1.6. The South being by far the most prevalent, may account for the extreme dampness of the air, in this month, as also the formation of the Coast at Pooree where all winds between S. W. and E. S. E. are from the sea, and damp. The Barometer was affected here by the Cyclone which raged so furiously at Calcutta on the 14th and 15th May last. The atmosphere was much disturbed, and the whole lower currents of air underwent a complete change, although the wind from the Cyclone itself did not reach us in any strength. The sky was overcast with drizzling rain until 4 p. m., and there was a most lurid and

threatening appearance in the sky to the East and E. N. E. during the whole day. The Cyclone was evidently travelling up to N. N. W., and Calcutta would be nearest its centre, when the wind came about N. by E., when it must have raged furiously. The Barometer stood thus here: Sunrise 29.420; 9 h. 50 m. A. M. 29.437; at Noon, 29.393; at 2 P. M. 29.371; at 4 A. M. 27.349, at which time it was at its lowest ebb, and from which it gradually came round again to its accustomed height. The wind was thus: sunrise N. by E.; 9 h. 50 m. A. M. N. N. W.; Noon N. W.; 2 P. M. W. N. W.; 4 P. M. W. by N.; when from that time, it came round to S. of W., thus making a half circle round the compass in the 24 hours. We had a very heavy thunderstorm here yesterday, in which I remarked a curious phenomenon, which I never observed before. The Barometer fell in the violent gusts of wind, and they *were* violent as you may suppose when I tell you that trees of three feet in diameter were broken in two at their lower and strongest part, and great branches of mango trees in a tope not far distant, were torn off, and thrown to a distance from their stem, and the rain, which came down actually in sheets of water, was forced through the venetians into my room although they were closed and fastened at the time, and fell in a shower of spray on the middle of the floor, wetting everything; the woodwork of the venetians was wetted outside and inside at once, and simultaneously, and in sheets along the wood, as if the rain had violently driven through its pores—the venetians all the time never opened in the least, for I watched them particularly. I also, when going outside to see the lightning, which was so vivid as to make the deep darkness caused by the storm at once lighten into the brightness of the day, so instantaneous and without intermission, that flash followed flash, and peal upon peal, without a moment's pause, was driven forcibly against the wall, and held there for some moments by a pressure that I could not overcome with all my strength, and was quite exhausted when I got inside. As I was saying, the Barometer fell in the gusts to the 1-10th of an inch, and rose as suddenly to within the same space. The Thermometer did the same, and it was curious and beautiful to see how they came together at once without any pause between them: twice they fell to two-tenths of an inch, and three times to the one-twentieth, during the extreme violence of the wind, which was as strong at the time as any hurricane, but fortunately only lasted for half an hour with this extreme fury. The thunder was ushered in by four peals which fell on the ear like cannon, with an astounding crash, and the flash that followed was so white and dazzling that it quite overpowered the light for a moment, and set one blinking like an owl

when it comes to daylight. None of the other peals, save these four, were near. The lightning that came before them was all of a dark red, showing the storm evidently high up, as taking place in highly rarified air. *What was curious to observe was, that the wind was very violent before the lightning began, that when the latter was in great force and flow, the wind lulled a little, but that when there was an interval between the flashes, the wind again renewed its force with redoubled fury, proving the electric origin of the wind, as, had it not been neutralised by the flashes it would have come on as a Cyclone.* The Barometer also fell after a strong flash of lightning, equally as with a violent gust of wind, showing that in which shape soever the disturbance was neutralized, with that shape it was contented and would rise. The storm also was very violent at particular places, and limbs of trees were wrenched round and torn off in some, whilst in others they were not touched. The Barometer fell at the beginning of the storm, thus showing that it was to be a very strong one. I have never remarked it to do so in any storm before, and I always watch it invariably rising as the storm approaches. I never before observed it fall. The thatch of many of our houses was blown off, and strewed the road and gardens for some distance around. *I myself distinctly heard a peculiar noise in the wind, not that as if it echoed from the building and walls, as I heard it outside in the verandah, but a screaming kind of noise, such is described to take place in Cyclones.* I may say that though this place is noted for thunderstorms, and though they are very violent, and that we have had many since our arrival, I have never seen anything that came up to the violence of the present one, both for violent gusts of wind, and quickness, and vividness of the flashes of lightning,—but I have said enough about storms."—*Bombay Times, July 7.*

Report from Balasore, by A. BOND, Esq. Master Attendant.

On the 12th and 13th instant, two days prior to the gale, there was a great closeness in the atmosphere, Thermometer being at Noon 92°, light breeze from the S. E. with a gathering of heavy clouds from E. S. E. to E. N. E. indicating wind and rain. During the gale at 5 P. M. of the 14th, there appeared to the E. N. E. a heavy bank of clouds shewing a storm at that point, whilst we had the wind here at N. N. W. with a stiff breeze which a ship could carry single-reefed topsails with. The weather was similar to the N. N. E. and S. W., and close up to Kontai (Hidgellec) it was not much stronger than here, no houses having been blown down.

BALASORE.

State of the weather on the 14th May, 1852.

13th May.—Bar. 29.58. Wind S. E. with slight rain; cloudy to the E. S. E. and E. N. E.: Noon Ther. 92°.

14th—Bar. 29.58; at 6 a. m. light breeze, wind N. E. and very cloudy, Ther. 88°; at 10 a. m. Bar. 29.48. Weather cloudy and threatening with a very light shower from the N. N. E.; Noon Bar. 29.45, breeze increasing from North to N. N. W. with smart showers of rain, Ther. 86°; at 2 p. m. Bar. 29.36 with heavy rain from the Northward, and a dense cloud hanging to the E. N. E. shewing a gale there. At 5 p. m. Bar. 29.29; Ther. 84°, heavy rain with strong gusts of wind, the dark bank still remaining to the E. N. E. whilst the wind here is shifting more westerly, wind N. N. W.; at 6 p. m. Bar. 29.29; Ther. 84°, wind N. W.; at 7 p. m. and puffy and the Bar. and Ther. remained at that height till Midnight when the Bar. rose to 29.33, and the wind decreased; it having got round to W. N. W. and W. S. W.

15th.—Bar. 29.58; Ther. 83; at 6 a. m. wind S. W. fine breeze and pleasant weather, but still cloudy.

Report (as published in the newspapers) of the foundering of the ship DUBLIN, Capt. ROBINSON, from Calcutta bound to London.

This ship was left by her Pilot on the morning of Thursday the 13th May, 1852, and with the wind at E. N. E. she unfortunately committed the old error of standing close hauled to the S. Eastward instead of bearing up, which would have brought her quickly on the Western and S. Western quadrants of the storm. After standing on, she finally hove to so as to wait for the centre to come up to her. The following is abridged from the newspaper account.

"The commander of the *Dublin* and part of her crew have reached at Contai or Hidgellee, near Balasore. The following statement has been sent to Calcutta by Captain Robinson:—

Contai, 19th May, 1852.—I was compelled to abandon the Dublin on Saturday morning, she having then nine feet water in her and fast settling down.

The pilot left me on Thursday morning, the wind drawing from the eastward and beginning to puff up; at Noon double reefed the topsails. I carried on a press of canvas to get to the Southward. At 4 p. m. close reefed the topsails. Wind E. N. E. At 6 p. m. stowed the foresail, at 10 p. m. blowing with fearful violence stowed fore-topsail and hove her too under

close-reefed main topsail, her head to the S. S. E. Midnight blowing very hard with small rain at times. At 4 A. M. Friday, Barometer falling; 8, wore ship to the N. Westward, expecting by Piddington's Law of Storms that the centre bore S. S. E. from me, and by having my ship's head to the Northward, I should be able to come up to the wind as it shifted and prevent my vessel being taken aback. Lashed hammocks in the mizen rigging. At 10 A. M. Barometer still falling down to 28.30, blowing a terrific hurricane, all my bulwarks gone, the cabin doors and front of the poop stove in and the sea washing over us. All hands lashed to the pumps. I got the carpenter's axe ready to cut the lee rigging, as I expected to see the masts go over every minute. Noon, blowing still harder with dreadful rain and almost as dark as night. At 4 P. M. Barometer still falling, down to 28. The hurricane at its extreme violence, and the rain was dreadful. I was lashed close to the man at the wheel. I became quite deaf with the quantity of rain and sea that was going down my ears. At 6 P. M. Barometer rising, wind shifting to the Northward. At 7 P. M. wind N. W. hurricane still blowing very hard with a fearful cross sea on. At 8 P. M. set the goose wings of the foresail and got the ship before the sea to the Southward. At midnight wind abating fast, all hands still at the pumps, when the crew were completely done up and said the vessel was sinking; could not sound the pumps on account of the repeated heavy seas washing fore and aft. Daylight sounded the well and found eight feet water in her, her paint streak completely in and her stern windows not far from the water. I saw I had no time to lose. I called to them and said "then the only chance that remains is to take to the boats, and it shall be that the starboard watch takes the starboard boat, and the larboard watch the port boat. I will not pick any one." One boat only reached the shore about Pipley."

Abridged Report from the H. C. F. Light Vessel STAR, Eastern Channel Station Lat. 21° 4' N. Long. 88° 14' East.

The H. C. F. L. Vessel "Star" experienced a very heavy gale of wind on the 14th. It commenced on the 13th in the afternoon from E. by N. gradually increasing, and on the 14th it blew a perfect hurricane with a tremendous sea running. Vessel pitching and labouring very much and shipping great quantities of water over all; at midnight the wind gradually veered round to N. W. with very heavy squalls and gusts of wind with a frightful sea running. On the 15th at 2 A. M. the gale abated and the wind veered round to West.

On the 14th October, 1852.—At 11 A. M. observed the vessel take a great sheer to E. S. E. perceived that the cable had parted 20 fathoms from the hawse (the vessel at the time riding with 190 fathoms) immediately let go the starboard anchor and whilst veering out cable, it parted at 60 fathoms; cleared away the larboard waist anchor, which had the chain bent on, immediately let it go and veered out to 70 fathoms, but still finding the vessel driving in a Westerly direction immediately got the starboard cable aft to the starboard waist anchor and clinched it, which no sooner done, then it was let go and veered out to 130 fathoms, which apparently brought the vessel up. At 6 P. M. the vessel took a tremendous roll and filled the starboard quarter-boat; it blowing then a perfect hurricane and a frightful sea running, cut it away to save the mizen mast and port quarter boat, Barometer down to 28.36.

15th.—A. M. blowing a hurricane from N. W.; at 1 A. M., in a tremendous squall parted the starboard cable at 130 fathoms; wind veered round to West when the gale abated, the vessel then having the chain anchor down; found we were in 25 fathoms of water from 10 to 12 miles W. S. W. of the station. In consequence of the heavy sea running, it was not practicable to heave the anchor up for fear of parting the chain, at Noon Lat. by Obs. 20° 55' North.

The vessel has sustained no damage as regards her hull, masts or rigging.

16th.—At Noon hove up, made all sail to regain our station, which we reached at 6.30 P. M. and showed the usual station light.

*Abridged Report from the H. C. P. V. CAVERY, commanded by MR.
R. HAND, B. P. Pilot's Ridge Station.*

On the 14th inst. at 6.30 A. M. the vessel parted, riding with 150 fs. of cable on the Eastern edge of the Pilot's Ridge in 24 fs. water, 3 miles E. by N. of the Pilot's Ridge light vessel.* 7 A. M. set the close reefed main topsail, reefed foresail and fore topmast staysail; wind N. E. steered down S. S. E. to stretch out clear of danger, after which I intended to lay to on the starboard tack. As I went to the Southward, wind came more North about, I then thought there was a chance of running clear of the hardest part, by continuing on my Southern course. At 10.30 A. M. furled foresail, and main topsail. It now became actually requisite for the safety of the vessel to keep her before the wind and sea, and to accomplish this it was evident that the mainmast must be cut away, not having succeeded in cutting away the main topmast; this was done, and the vessel became more easy, and steered with evident ease before the wind, and as the wind veered to the Westward the vessel's head came round to the Eastward the lowest range of the Barometer being 28.64.

* Lat. 20° 49' N. Long. 70 46' E.

Abridged Copy of the Log of the H. C. P. V. CAVERY,
Friday, 14th May, 1852.

A. M. fresh gales from N. E. to E. and heavy sea.
 4 A. M. a heavy squall from E. N. E.
 5 A. M. dirty appearance, fresh squalls from E. N. E. with rain. Ridge F. L. Vessel W. by S.; too thick to see the *Tavoy*.
 6.30 A. M. parted and stood down S. S. E. under a close-reefed main topsail and reefed foresail, wind increasing and sea rising fast; each successive squall striking the vessel with increased fury, burying her at times completely under water.

About 10.30 A. M. clued up the foresail and main topsail, and with some difficulty furled them, wind from N. N. W. to N. W. steering from S. S. E. to S. E. by E.

About Noon the vessel broached to against her helm, bringing her broadside on to a terrific sea, which broke over her fore and aft; Barometer at this time commenced to fall with fearful rapidity, the wind and sea increasing every minute, the squalls bringing the vessel to leeward as far as the fair leaders of the lower rigging; endeavoured to get her before the wind (which at this time was oscillating between N. W. and N. N. W.) by hoisting the foretop mast staysail which had been bent afresh, but it blew clean away in the attempt. Having lost all management of the vessel from her being under water to leeward, and the sea breaking with tremendous force over her (washing overboard hen-coops, &c.) tried to cut away the main topmast to get her before the wind, but the mast would not go, and the position of the vessel being momentarily more perilous, it was resolved to cut away the mainmast which was done forthwith, between 1 and 2 P. M. the wreck was cleared as soon as practicable and the vessel paid off before the wind, much water continually on her decks, the scuppers not being sufficient to carry it off; it is supposed that during this time the carpenter was washed over-board, he having been last seen so employed. At about 2.30 P. M. the Barometer commenced to rise and the strength of the hurricane abated, when the wind oscillated from N. W. to W. and at 8 P. M. was W. N. W.; from this time the weather rapidly cleared, the Barometer rising as fast as it fell; at about 11.30 P. M. set the fore topsail double reefed and hove her to on the port tack, wind at West and sea fast decreasing.

Register of Barometer, 14th May, 1852, H. C. P. V. CAVERY.

2	A. M.	29.54	Squally appearance E. N. E.
4	"	29.54	Heavy squall from W.

6	A. M.	29.48	Passing squalls and rain.
7	"	29.44	"
8	"	29.43	The same N. E.
9	"	29.42	"
10	"	29.37	N. N. E.
10.15	"	29.30	Heavy squalls from N. to N. N. E.
10.30	"	29.25	N. to N. N. W.
11	"	29.20	Tremendous ditto ditto N. N. W. to N. W.
11.40	"	29.65	"
Noon	"	29.5	"
12.15 P. M.	"	29.0	"
12.30	"	28.90	"
12.45	"	28.85	"
1	"	28.78	"
1.30	"	28.64	Terrific from N. N. W.
1.45	"	28.64	"
2	"	28.64	"
2.30	"	28.70	"
2.45	"	28.77	"
3.15	"	28.80	"
4	"	28.90	Not in such quick succession.
5	"	29.0	N. W. to W.
5.30	"	29.4	"
6.15	"	29.10	More moderate W. S. W.
7	"	29.25	"
8	"	29.40	"
10	"	29.45	S. W.
Mid.		29.50	"

(Signed) R. HAND, B. P.

*Abridged Report from the H. C. P. V. SALWEEN, MR. J. W.
ROBERTS, B. P. South Channel.*

At 2 p. m. on May 13th.—I had anchored in 12 fms. water in the South Channel, having been driven there by a fresh Easterly breeze, while taking the pilots from the outward bound ships. The South Channel Buoy bore about W. $\frac{1}{2}$ N. 3 miles and after veering to 75 fms. and sending down the top gallant yards and masts, I considered it expedient about 7.30 p. m. to veer to 145 fms. of cable as there was a chopping sea. The cable was quite new, but at midnight the vessel had parted at about 130 fms. Hove the remainder of the cable in and stood to S. E. by S. Wind fresh from

E. N. E. under double reefed topsails and reefed courses. At daylight of the 14th of May ; more gusty, close reefed the topsails and about 8.30 A. M. we were under bare poles on the port tack. The wind N. E. and the sea increasing. The squalls at last became so furious and the sea of course so heavy, that as the vessel lay over, the upper dead eyes of the lower rigging on the starboard side were frequently awash.

The centre of the Cyclone passed to the Westward of us about 3.30 P. M. and at 6.30 P. M. having gradually come up on the port tack from S. E. at 8 A. M. to North, we wore to the Southward ; the wind being of course West and by midnight the gale was over.

MAY 12TH, 1852.

Hours.	Bar.	Ther.	Wind.	Force of Wind.
10 A. M.	29.81	85	S. E. to E. S. E.	2
Noon.	29.75	85	"	3
4 P. M.	29.75	85	"	2
8 "	29.79	85	"	2
Midnight	29.79	85	E. S. E.	2

MAY 13TH, 1852.

4 A. M.	29.69	85	East to E. N. E.	3
8 "	29.73	86	"	4
10 "	29.72	85	East.	6
Noon	29.69	85	East to E. N. E.	5
4 P. M.	29.61	85	E. N. E.	6
8 "	29.60	85	E. N. E. to N. E.	6
Midnight	29.56	85	E. N. E. to East,	6

MAY 14TH, 1852.

2 A. M.	29.32	85	N. E. to E. N. E.	7
3 "	29.43	85	"	7
4 "	29.45	85	N. E. by E.	8
5 "	29.40	85	N. E.	9
6 "	29.35	85	"	9
7 "	29.31	85	"	9
7.30 "	29.34	85	"	9
8 "	29.30	85	"	10
8.30 "	29.29	85	"	11
8 "	29.25	85	"	11
10 "	29.20	85	"	11
11 "	29.22	85	N. N. E.	12
11.30 "	28.95	85	"	12
Noon	28.86	85	"	12

1 P. M.	28.86	85	N. by E.	12
2 ,,	28.80	85	N. by W.	12
2.30 ,,	28.80	85	N. N. W.	12
3 ,,	28.75	85	N. W.	12
3.30 ,,	28.72	85	"	12
4 ,,	28.80	85	W. N. W.	12
5 ,,	28.85	85	W. by N.	11
5.30 ,,	28.95	85	West.	11
6 ,,	29.01	85	"	11
6.30 ,,	29.05	85	"	11
7 ,,	29.10	85	W. by S.	11
8 ,,	29.21	85	W. S. W.	10
9 ,,	29.32	85	"	10
10 ,,	29.45	85	"	9
11 ,,	29.45	85	"	9
12 ,,	29.50	85	W. S. W.	9

MAY 15TH, 1852.

2 A. M.	29.55	85	S. W. b. N.	8
4 ,,	29.55	85	"	8
5 ,,	29.60	85	"	8
6 ,,	29.60	84	W. S. W.	7
8 ,,	29.65	84	"	7
10 ,,	29.68	85	"	7
Noon	29.70	85	"	7
4 P. M.	29.65	85	S. W.	6
8 ,,	29.70	85	"	6
Midnight	29.72	85	"	6

Abridged Report from the Log of the Barque EASURAIN from Mr. Mate Pilot G. B. YOUNG.

At daylight on the 13th May, 1852, we weighed from Cowcally Roads with a N. E. wind and fine weather, and proceeded down Lloyd's Channel; at 8 A. M. wind veering to E. N. E. anchored by Saugor Flat Buoy, with it bearing E. S. E. $\frac{1}{2}$ a mile, thinking it prudent to take up this position to ride out Easterly winds; made all preparations, having occasional puffs of wind; during the day veered to 50 fms. Winds E. N. E., Bar. 29.70.

Friday 14th.—At 4 A. M. blowing fresh from N. E. and very squally appearance, Barometer 29.60; Noon Barometer 29.40. Breeze still increasing in heavy squalls, let go the starboard anchor and veered out 20 fms. cable, we then got the third anchor over the bows and bent 45 fms. of spare cable to it.

9 p. m. Barometer falling to 29.24: 10.30 p. m. blowing a complete hurricane with terrific gusts from North, heavy sea, Barometer 29.13 falling to 29.08 veered away cable as fast as we could, but owing to part of the crew leaving off work, we could not do it very quickly.

Midnight a furious gale from North, heavy sea, Barometer on the rise 29.10 part of crew pumping, others hiding themselves.

Saturday 15th.—About 1 a. m. Barometer 29.20: ship began to drive, paid out nearly the whole of the starboard cable; 1.30 a. m. blowing a complete gale from N. N. W. with heavy gusts and rain, heavy sea, drove foul of the *Grappler* Buoy vessel, did not see her till we were along side; when we drove past her we cut away the 3rd anchor and veered out all the chain upon it, viz. 45 fms.

2 a. m. we took the ground abaft lightly but afterwards began to thump heavily, cut away the mainmast which eased the ship considerably, I conjectured, we were aground on Saugor Flat.

3 a. m. winds veered to W. N. W. Barometer 29.40, heavy surf breaking over us, four feet water in the hold. Daylight Barometer 29.50; winds W. S. W. found that the vessel was on shore abreast of the site of the New Light House on Saugor Point with six feet water in her hold; concluded she was bilged, some of her sheathing flanks floating up, the *Grappler* Buoy Vessel sent her boat which boarded us at 11 a. m.

G. B. YOUNG, *Mate Pilot.*

Abridged Report of the H. C. P. V. SAUGOR, MR. C. BLAKE, B. P. Pilot's Ridge.

On the 13th May, 1852.—At daylight the weather assumed a threatening appearance. We made all preparations for a gale. Weather growing too boisterous while we were heaving in cable could not sight the anchor.

The *Saugor's* log of winds, weather, Barometer and Thermometer for the days of the 13th and 14th of May, 1852, is as follows :

13th May.—First part a pleasant breeze, wind East, Bar. 29.61; Ther. 83°. 2nd part fresh N. East wind, Bar. 29.66; Ther. 85°. Noon strong E. N. E. wind, weather threatening, Bar. 29.66; Ther. 86°. Last part hard gale, wind E. N. E. Bar. 29.56; Ther. 85°. 5th part hard gale, wind E. N. E. Bar. 29.54; Ther. 84°. 6th, midnight, hard gale from N. E. Bar. 29.53; Ther. 83°.

14th May.—First part wind from E. N. E. to N. East, increasing to a hurricane, Bar. 29.48; Ther. 83°. 2nd part wind N. E. increasing to a hurricane, Bar. 29.36; Ther. 82°. 3rd Noon, wind N. E. heavy sea and rain, hurricane increasing, with Bar. 29.28; Ther. 81°. 4th part the hurricane

at its climax, heavy sea and rain, Bar. 28.96; Ther. 80°. Lastly, symptoms of abatement, wind N. b. W. Bar. 29.00; Ther. 80°. Midnight wind N. West, hurricane fast abating, Bar. 29.28; Ther. 81°.

The *Saugor* rode out this hurricane with two hundred and ten fathoms of cable. It did not blow where she was lying so heavily as others that I recollect.

*Report of the GRAPPLER Buoy Vessel, MR. J. H. CHALKE, B. P.
At Saugor.*

Friday May 14th, 1852.

Barometer. Wind and Weather.

4	A. M.	29.78	Blowing fresh from E. N. E. with passing squalls heavy.
6	"	28.76	Cloudy weather.
7	"	29.68	
8	"	29.64	Blowing hard from E. N. E. squally threatening
9	"	29.63	weather.
10	"	29.62	
11	"	29.60	
Noon		29.58	Blowing a gale from N. E. with hard squalls and
1	P. M.	29.51	heavy rain.
2	"	29.47	
3	"	29.41	
4	"	29.34	Increasing gale from N. N. E. with very heavy gusts
5	"	29.32	and rain.
6	"	29.30	
7	"	29.28	
8	"	29.28	Blowing a hard gale from North with heavy gust
9	"	29.26	accompanied with torrents of rain.
10	"	29.24	
11	"	29.24	
Midnight		29.22	Gale increasing from North, frequent heavy gusts blowing, and rain.

Saturday, May 15th, 1852.

1	A. M.	29.21	From 1.30 to 2.30 A. M., gale blew its hardest from
2	"	29.20	North to N. by W. and N. N. W.
3	"	29.22	
4	"	29.38	Drawing round to the Westward and moderating daylight.
5	"	29.50	Gale moderating fast, Barometer rising.
6	"	29.55	
10.30	"	29.70	Moderate breeze from S. S. W. and fine weather.

9 p. m. Barometer falling to 29.24: 10.30 p. m. blowing a complete hurricane with terrific gusts from North, heavy sea, Barometer 29.13 falling to 29.08 veered away cable as fast as we could, but owing to part of the crew leaving off work, we could not do it very quickly.

Midnight a furious gale from North, heavy sea, Barometer on the rise 29.10 part of crew pumping, others hiding themselves.

Saturday 15th.—About 1 a. m. Barometer 29.20: ship began to drive, paid out nearly the whole of the starboard cable; 1.30 a. m. blowing a complete gale from N. N. W. with heavy gusts and rain, heavy sea, drove foul of the *Grappler* Buoy vessel, did not see her till we were along side; when we drove past her we cut away the 3rd anchor and veered out all the chain upon it, viz. 45 fms.

2 a. m. we took the ground abaft lightly but afterwards began to thump heavily, cut away the mainmast which eased the ship considerably, I conjectured, we were aground on Saugor Flat.

3 a. m. winds veered to W. N. W. Barometer 29.40, heavy surf breaking over us, four feet water in the hold. Daylight Barometer 29.50; winds W. S. W. found that the vessel was on shore abreast of the site of the New Light House on Saugor Point with six feet water in her hold; concluded she was bilged, some of her sheathing flanks floating up, the *Grappler* Buoy Vessel sent her boat which boarded us at 11 a. m.

G. B. YOUNG, *Mate Pilot.*

*Abridged Report of the H. C. P. V. SAUGOR, MR. C. BLAKE, B. P.
Pilot's Ridge.*

On the 13th May, 1852.—At daylight the weather assumed a threatening appearance. We made all preparations for a gale. Weather growing too boisterous while we were heaving in cable could not sight the anchor.

The *Saugor's* log of winds, weather, Barometer and Thermometer for the days of the 13th and 14th of May, 1852, is as follows :

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14th May.—First part wind from E. N. E. to N. East, increasing to a hurricane, Bar. 29.48; Ther. 83°. 2nd part wind N. E. increasing to a hurricane, Bar. 29.36; Ther. 82°. 3rd Noon, wind N. E. heavy sea and rain, hurricane increasing, with Bar. 29.28; Ther. 81°. 4th part the hurricane

at its climax, heavy sea and rain, Bar. 28.96; Ther. 80°. Lastly, symptoms of abatement, wind N. b. W. Bar. 29.00; Ther. 80°. Midnight wind N. West, hurricane fast abating, Bar. 29.28; Ther. 81°.

The *Saugor* rode out this hurricane with two hundred and ten fathoms of cable. It did not blow where she was lying so heavily as others that I recollect.

*Report of the GRAPPLER Buoy Vessel, Mr. J. H. CHALKE, B. P.
At Saugor.*

Friday May 14th, 1852.

Barometer.

Wind and Weather.

4	A. M.	29.78	Blowing fresh from E. N. E. with passing squalls heavy.
6	"	28.76	Cloudy weather.
7	"	29.68	
8	"	29.64	Blowing hard from E. N. E. squally threatening
9	"	29.63	weather.
10	"	29.62	
11	"	29.60	
Noon		29.58	Blowing a gale from N. E. with hard squalls and
1	P. M.	29.51	heavy rain.
2	"	29.47	
3	"	29.41	
4	"	29.34	Increasing gale from N. N. E. with very heavy gusts
5	"	29.32	and rain.
6	"	29.30	
7	"	29.28	
8	"	29.28	Blowing a hard gale from North with heavy gust
9	"	29.26	accompanied with torrents of rain.
10	"	29.24	
11	"	29.24	
Midnight		29.22	Gale increasing from North, frequent heavy gusts blowing, and rain.

Saturday, May 15th, 1852.

1	A. M.	29.21	From 1.30 to 2.30 A. M., gale blew its hardest from
2	"	29.20	North to N. by W. and N. N. W.
3	"	29.22	
4	"	29.38	Drawing round to the Westward and moderating daylight.
5	"	29.50	Gale moderating fast, Barometer rising.
6	"	29.55	
10.30	"	29.70	Moderate breeze from S. S. W. and fine weather.

Abridged Report from the H. C. F. Light Vessel HOPE, Gasper Station.

I beg leave to inform you that at 8 p. m. on Saturday the "Hope" F. L. V. began to drive, but brought up again in about 15 minutes, with the 2nd anchor, which was let go immediately she began to drive. On Sunday at 2 p. m. the vessel was anchored again on her station.

The hardest of the gale was from North to N. W. a perfect hurricane but the *Hope* behaved beautifully, and all was in readiness for a Cyclone.

Abridged Extract from the Log of the H. C. F. Light Vessel HOPE Gasper Station.—By Mr. Tho. H. COLLINS, Mate in Charge.

Thursday, May 13th, 1852.—8 a. m. fresh easterly winds with dirty threatening appearance; 10, veered to 145 fms. port anchor. Sunset ranged the starboard cable to 50 fms. Barometers going down during the day; at midnight Aneroid 30.10; Ship's Bar. 29.58; Comdrs. Bar. 29.65 with a fresh E. N. E. wind and a heavy sea.

Friday May 14th.—Daylight blowing strong from the N. E. with threatening appearance and a heavy sea running, veered to 180 fms. made preparations for bad weather; 11 a. m. a gale from the N. E. *veering to the Northward in the squalls.** Noon blowing a heavy gale from the N. E. with heavy squalls and rain; 8 p. m. a heavy gale at N. b. W. with a heavy sea, vessel commenced driving, let go the starboard anchor; at 8.15 brought up in $4\frac{1}{4}$ fms. veered to 200 fms, hauled up and ranged 50 fms. of chain cable; 9, wind N. W. b. N. veering to the Westward blowing a perfect hurricane. It will be seen by the annexed table that the Barometers fell until 8 p. m. and then commenced rising, without however any diminution in the strength of the wind. Midnight blowing a hurricane at N. W. b. W.

Saturday, May 15th.—1 a. m. wind W. N. W. forestay sail blew away; 2 to 4, gale moderating; squalls less frequent and decreasing in strength, at 4, blowing strong from the Westward and gradually moderating. Daylight 5 vessels to the Northward, one totally dismasted, and another sunk close to the upper Middle Ground Buoy; a heavy sea running and unable to offer any assistance. Lower Gasper Buoy bearing N. W.; upper Middle Ground Buoy N. b. W. $\frac{1}{2}$ W. in $4\frac{1}{2}$ fms. low water, ship about a mile and half S. E. from her station. 10, moderate breeze from the Westward, hazy weather and a heavy sea running.

* Italics are mine.—H. P.

A Table shewing the change in the Barometer and the veering of the wind from 4 A. M. of Friday, 14th May, to 8 A. M. of the 15th instant. H. C. F. L. Vessel HOPE.

Hour.	Aneroid.	Ship's Bar.	Comdrs. Bar.	Winds.
4 A. M.	30.7	29.54	29.60	
6 14th	30.5	29.52	29.55	
8	30.2	29.50	29.55	
10	29.98	29.45	29.50	
Noon	29.95	29.41	29.48	N. E. { Squalls more frequent and increasing in strength.
2 P. M.	29.85	29.37	29.41	
4	29.73	29.20	29.28	
6	29.52	28.97	29.00	N. N. E. to North.
8	29.45	29.00	28.98	N. b. W.
9	29.50	29.10	29.05	{ N. W. b. N.
10	29.55	29.16	29.11	
11	29.61	29.24	29.20	N. W.
12	29.65	29.32	29.30	N. W. b. W.
1 A. M.	29.72	29.40	29.38	W. N. W.
2 15th	29.85	29.53	29.50	W. b. N. squalls less frequent and decreasing.
4	29.92	29.60	29.59	
6	30.00	29.65	29.63	{ West a strong breeze.
8	30.7	29.67	29.70	

*Reports by Electric Telegraph from Diamond Harbour,
14th May, 1853, State of the Weather.*

At Diamond Harbour.—Morning light winds from N. East, with drizzling rain, at noon strong breezes from East, attended with slight showers of rain, and cloudy weather. Thermometer at noon 87°. Wet bulb 78°. From noon till 6 P. M. blowing violently from East, with heavy rain.

Aneroid Barometer, at 10 A. M. 29.600

————— at 4 P. M. 29.400

Standard Barometer at 7 P. M. 29.450

Fall of rain, at Diamond Harbour, from noon till

6 P. M.	Inches 0.70
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Calcutta,	0.20
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to 7 P. M. 14th May.

15th May, 1852, Diamond Harbour Report. Received at 7 A. M.

From 8 P. M. to 12 P. M. last night blowing violently from East, with heavy rain—at 1 A. M. the wind veered to N. West, blowing still harder. At 4 A. M. a perfect hurricane—still continues—several huts and trees

have been blown down in the village—our Raingauge has also been blown down, therefore we are unable to give the fall of rain.

Standard Barometer at 10 A. M. 29.540

State of the Weather.

At Diamond Harbour.—From 6 A. M. blowing furiously from West, and slight rain, the premises and the station huts have been much injured, Weather cloudy. Thermometer at noon 83°. Wet bulb 78°.

Aneroid Barometer, at 1 P. M. 29.55

————— at 4 P. M. 29.55

On the 16th, fine Southerly breeze is reported.

Register of the Barometer and Wind during the Gale of the 14th and 15th May, 1852, on Board of the P. and O. Co.'s Steam Ship HINDOSTAN, Garden Reach.

Time.	Bar. by Cox.*	Bar. by Lilley.	Wind.	Hindostan.	Garden Reach.
8 A. M.	29.67	..		Friday, May 14th.	
				Ther.	
Noon	29.58	..	E. N. E.	80°	
3 P. M.	29.50	29.52	..		
5.30	29.46	29.43			
8.0	29.40	29.36	N. N. E.	78	
9	29.37	29.33			
10	29.27	29.24		75	
11	29.19	29.13			
Midn.	29.9	29.63	North.	75	
1 A. M.	28.94	28.84			Saturday, May 15th.
2	28.87	28.83	N. W.	75	
2.50	28.89	28.88			
4	29.01	29.03	West and		
5	29.13		W. N. W.		
6	29.26	29.23		75	
8	29.41	29.35		78	
11	29.53	29.42			
Noon	29.55	29.48	W. by N.	80	

* Barometer compared with the Standard at Madras Observatory, each Instrument 30 feet above the level of the sea.

Calcutta Newspaper Account.

During the storm of Friday night, nearly all the ships in the Cooley Bazar moorings parted their own chains. The *Glentanner* parted her own chains at the Calcutta moorings, and went on the bank ; it is thought she will have to go into dock. The *City of Calcutta* dragged both her anchors, got foul of the Government moorings, and got on shore at Chandpaul Ghat, little or no damage done. All the ships in the harbour dragged their anchors more or less. Numbers of boats, bauleahs, budge-rows, pinnaces, and country boats were swamped, and a great deal of property lost. The river, on Saturday morning, was covered with bales of jute, silk, opium, masts and spars of vessels, the wrecks of dinghees, &c. Some lives are supposed to have been lost, but as the gale came on in the evening, the boats were mostly moored to the shore where escape was easy.

In Calcutta much mischief was done to buildings. An unfinished house in the Chitpore road, belonging to one of the Mullick family, fell down upon the adjoining stables, and destroyed some valuable horses and carriages. In Moorgeehutta a lower-roomed house fell in, and buried an elderly lady and her two grandchildren under the ruins. By the exertions of a neighbour, Mr. Arathoon, the lady and one of the children were extricated without serious injury, the other child, a girl of five years old, was killed.

In the suburbs, hundreds of huts were levelled with the ground, and the gardens every where laid waste.

On the Barrackpore road about fifty of the largest trees were uprooted, some of them fell across the road, making it nearly impassable in several places. About the station many large trees were prostrated, but the Park fortunately escaped with little serious injury, though the fences were blown down in many places.

About Calcutta the trees are stripped of fruit, mangoes particularly, but what is very remarkable is the number of crows which have perished. Heaps were piled up at the corner of many streets on Saturday. They generally take care of themselves, but this being the breeding season, it is supposed they would not quit their nests. There has been great destruction among the yachts. Two or three are lying sunk near the Fort, and several others are reported missing.

My own observations at Calcutta are as follows.

14th May, 1852.—During the night, squalls and light rain from the Eastward with puffs of wind, rising and falling at times. At 2 a. m. Bar.

low, about 29.76.* Daylight to sunrise, fresh breeze N. East. A bank of stratus and nimbus from East to N. East with heavy masses of loose ragged cumuli which were breaking and passing over us in loose detached ridges, and webs of smoky scud. *About 6 a. m. weather seemed to clear up from the Eastward but no rise of Barometer.*†

At 10 a. m. Bar. (corrected to that of Surveyor General) 29.71; Symp. 29.90.

N. B. No rise since 4 a. m. rather a fall, Bar. being then about 29.74. Fresh breeze N. E., masses of dark smoky cumulous scud travelling from the Eastward. Bright sunlight where openings occurred and larger dark masses passing now and then. Wind E. N. E. blowing in strong squalls and puffs at times.

At 1h. 30' p. m. first dark rain squall occurred, at 1 p. m. Bar. 29.659; Symp. 29.85; Ther. 85 $\frac{1}{4}$ ^o. Squalls and puffs as before. Wind E. N. E. to N. East.

3h. 40' p. m. Bar. 29.609; Symp. 29.81; Ther. 85^o. 4h. 5' p. m. Bar. 29.529; Symp. 29.75; Ther. 84 $\frac{3}{4}$ ^o. Gloomy squalls and rain. Wind N. East. Scud N. East.

5h. p. m. Bar. 29.509; Symp. 29.75; Ther. 84^o. Wind N. N. E. to N. East with squalls and drizzling rain, but the rain in loose large drops! At 10h. 10' Bar. 29.309; Symp. 29.60; Ther. 82 $\frac{1}{4}$ ^o. Blowing hard from E. N. East as nearly as can be guessed.

At 11h. 20' Bar. 29.169; Symp. 29.50; Ther. 82^o; blowing a hard gale, but too dark to ascertain its exact direction; tremendous squalls at times.

15th May.

Time.	Bar.	Simp.	Ther.
a. m. 0h.5'	29.079	29.42	82 ^o
25	.009	.39	..
1. 5	28.879	.33	..
1. 45	.859	.30	..

Wind now to the Westward of North; heavy gale.

2h.15'	28.829	28	81 $\frac{3}{4}$ ^o
3 . 0	.909	34	81 $\frac{1}{2}$
3 . 20	.989	39	..

Wind N. Westerly.

4h.00'	29.059	44	81 $\frac{1}{4}$
6 . 30	.329	62	81

Heavy gale at West, scud from S. West.

8h.20'	29.499	29.64	81
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Decreasing gale West. By Noon, weather comparatively fine.

* Register blotted.—H. P.

† The treacherous clearing up for a short interval which I have so frequently adverted to.

Report from Baugundee, a Salt Agency Station, in Lat. 22° 38' N.; Long. 88° 57' East; about 39 miles E. b. N. from the Flag Staff of Fort William, by F. CRANK, Esq. Bengal Salt Agency.

It will be seen that this Cyclone fortunately* passed up to the Eastward of Calcutta, through the Sunderbunds where it not only tore to pieces every thing in its passage, even to a *pucka* (brick-and-mortar-built) house, but drove the river-steamers in their sheltered creeks into the jungle. A relation of Mr. Crank's shewed and allowed me to make some extracts from a private letter, and these together with Mr. Crank's very intelligent replies to a letter of queries subsequently addressed to him by me, have enabled me to frame the following very interesting narrative of the passage of the centre of a Cyclone on shore by a person, who was evidently perfectly cool and collected. In this summary, it will be recollect ed that the facts and most of the phrases are Mr. Crank's, and I have indeed sometimes given my own queries to introduce his reply verbatim.

"For a day or two preceding the gale there was a heavy scud from the Southward with a high temperature of from 90° to 93 in Mr. Crank's rooms to the Westward. The gale set in from the N. East on the 14th but by the time it was blowing a gale, it was at about E. N. East, and when the hurricane was at its height the wind was about two points to the Northward of East. Up to 2h. 30' A. M. of the 15th, it went gradually veering round to the Southward when a sudden lull of about ten minutes duration took place. He was looking from his door to the Westward when he heard the sound of the tempest approaching from the opposite point to that at which it had commenced, or South West. The sound was terrific and it burst with more violence than before on the Western side of the house tearing the thick beams of the verandah out of their places in the wall, and scattering them like straws, whilst the verandah itself covered with a double layer of Syrian or flat tiles, was pierced by it in several places ; holes of 6 or 8 feet in diameter being blown through the roof. He then thought it prudent to place his wife and family in security. The interval of the lull as before said was perhaps ten minutes when the wind shifted suddenly from about E. b. S. or E. S. E. to the S. West, and the hurri-

* I say fortunately, for we were thus 35 miles to the West of its centre where it evidently was of terrific violence, and had its track been up the Hooghly not a ship then in the river would have escaped. We may also judge in some degree how important to a ship even this short distance from the centre must be, and how it occurs so frequently that one ship is utterly torn to pieces *at* the centre while another escapes at a very short distance from it.

cane which ensued was terrific. When he left his house all the venetians, doors and glass windows of the upper and lower story were all blown in. The roof of one room had fallen, and the brick pillars of the verandahs were broken in two or three places, the storm had a clear drift through the house and some of the furniture was even blown out of the windows ; chairs, &c. being found on the bank of the river the following morning. There was no thunder or lightning during the storm. Mr. Crank being repeatedly out in it, so that he speaks very positively as to this, which he must have perceived had there been any. It was at three in the morning that Mr. Crank's family were obliged to take shelter; first in a low cow-house, of which the roof also beginning to give way they were driven as a last resource to a *pucka* (brick-built) pig-stye! which being still smaller and lower, and substantially constructed, fortunately withstood the fury of the elements,* which was so great that the family were repeatedly blown down in their retreat from the house to their place of refuge.

Mr. Crank stating in his private letter that "earthquakes prevailed throughout the whole night," my query on this head and his very important reply are as follows :—

In "What were the nature of the earthquake shocks you mention, and are you quite sure of them, as distinguished from the vibrations of the house in the gusts of wind? Are you also familiar with earthquake shocks so as readily to recognise them?"

Answer.—The shocks I experienced when out of the house, at about 2h. 15' A. M. of the 15th were oscillatory and very severe. One I experienced in the upper story of my house I cannot correctly describe. Another at 4 A. M. or thereabouts was of the same character as the above. It could not in this case have been the vibration of the building I was in, because it is an extremely low one, being used as a pig-stye and pigeon-house, and is a very strong *pucka* edifice. As I have experienced many earthquakes both in Persia and Assam, and am generally calm and collected I feel sure the shocks were those as described (to his Calcutta friends) and that throughout the night. After the hurricane set in, they were repeated. With the first shock outside the house, I plainly experienced a very unpleasant smell which I attributed to some gaseous exhalation ;† I have noted the same peculiar odour on other similar occasions,

* This is exactly the history of the Mauritius and West India planters, who on the large plantations have a strong low built "hurricane house" ready for these occasions, and on the poorer ones the families take refuge in the negro huts in sheltered spots.

† Perhaps Ozone?—H. P.

and I fancy it is corroborative of one of the theories anent these phenomena."

Mr. Crank mentioned also a confusion of strange and horrible sounds, and he describes them as follows :—

Query.—What were the nature of the sounds you describe? You were so near to, or at the passage of the centre, where these singular noises are frequently described, that it is of much interest to know something about them?

Answer.—“The sounds noted in my letter to Mr. R.—were of so peculiar a nature that I can scarcely describe them. You have doubtless been on the deck of a ship in a dark night where the upper sails have flapped against the masts? Such like sounds met my ears on the night of the 14th. Then it would appear as if vast bodies of winged animals were hurrying across, whose wings were striking against each other in a thousand directions.† These sounds were blended with others not less unusual—crashing like trees—whistling—roaring—or as if heavy bodies were falling from a height against each other, and by the concussion were shattered into fragments. At this time I was out on the plain, and the strife of the elements was awful; ever and anon such a pressure of the wind from above, that I was almost crushed to the earth; then it would strike me on one side—then on another, and I came to the conclusion that I was in the centre of a whirlwind.‡ I was for a time stupefied. To turn my face to the Eastward for more than a few seconds was impossible, the rain was driven with the force of arrows into the face, and the oppression was similar to what one feels on riding a fast horse at racing speed.*

Unfortunately, and this he very much regrets, as we must also do, the only instrument which Mr. Crank had with him was a Thermometer, which stood till the lull at about 88° in a room, but he is not certain as to a degree or so, not having his glasses at hand. At the time of the lull it became so exceedingly cold that every one remarked it, and on looking at the Ther. he found it standing at 65 or 66°! At daylight it was at 90° or something less.”

* The cracking of a huge electrical machine we might suppose to produce such sounds?—H. P.

† The rushing noise of the currents of air as generated by the electric discharge? see Peltier.—H. P.

‡ This passage is one of immense importance, for together with others which will soon be published, it settles the question of any upward tendencies of the wind at the centre in the negative, and very strongly corroborates my theory of electric and spiral currents.

In describing the track and ravages of the storm, Mr. Crank mentions that a large Casuarina tree, at about 100 yards distant from the East verandah of his house, was literally cut off even with the surface of the earth. His Bauleah which was securely fastened adjacent to it was torn to pieces, the roof of the cabin being thrown many hundred yards to the Westward; while some of the windows were picked up at nearly a mile distant.* His house was reduced to such a ruin that it was dangerous to approach it, the parapet wall, balustrades, &c. being, as it were, cut off.

Mr. Crank seems to think that the force of the storm was most strongly felt for about half a mile on each side of Baugundee, and he estimates the track of country over which it passed by the accounts from his salt chowkies (station houses). This would make the centre one mile in breadth only, and accounts in part for the awful violence of it within that limit, for it has always been found that when the diameter of the central lull is small, the intensity of the Cyclone there is much greater.

He farther states that great loss of life, and of cattle and other property took place in consequence of the excessive and sudden rise of the rivers all over the Sunderbunds, which obliged those who had no other resource to take refuge in the trees.

Reports from Steamers in the Sunderbunds.

Two of the River Steamers, one of them the property of Government and the other belonging to the Ganges Steam Navigation Company, were driven on shore in the Sunderbunds;† and carried by the storm wave up over the trees! into the jungle, from whence they had to be extricated by cutting canals after the Cyclone was over. The following are their logs which fortunately serve very accurately to mark the track of the centre, as they were on the Eastern verge of the centre (wind veering from E. S. E. to S. S. E. and South, to West) and their positions being at a short distance from each other only and 44 miles S. b. E. of Baugundee.

* In a severe Typhoon from the Bay of Manilla in 1816, when all the ships lying at Cavite were driven on shore, an American ship lost her cutters, which were blown from the davits. About a month after the gale the Captain of the ship taking a walk into the country saw something very strange in a mangoe tree near a village about four miles from the anchorage, and paid an Indian to get it down for him. It proved to be the stern of his own cutter!

† Indian readers do not require to be told, but some European ones may, that the Sunderbunds comprise a vast extent of low jungly islands, as large as the principality of Wales, intersected by a thousand large and small rivers, streams, and creeks forming the Delta of the Ganges and Hooghly, and in which boats are perfectly sheltered.

*Abridged Log of the H.C. Steamer "BERHAMPOOTER" P. M. CAWLEY,
Commander, towards the Presidency; 63rd trip. N. B.—At anchor
in the Soyah in Lat. 21° 54' N.; Long. 89° 02' East, by TASSIN'S
Map.*

Friday 14th May, 1852.

Bar.	Ther.	Time.	
29.55	82°	A. M.	Strong Easterly winds and cloudy.
..	..	5.00	Steam up, weighed, and proceeded full power.
29.50	88	Noon	Ditto winds with passing showers of rain.
..	..	1.10	Passed steamer <i>Chunar</i> , at anchor in the Fringhee Khall.
..	..	3 P. M.	Entered Attarah Banka river.
29.35	70	4.00	Increasing breezes and passing squalls from E. S. E.
..	..	5.15	Roymungul river.
29.20	..	5.30	Bearry Khall; observed every appearance of a gale from the Eastward, ran well up the Soyah for safe anchorage. Owing to the weather having a threatening appearance, Captain Cawley orders an Officer's watch to be kept.
28.80	..	7.15	Anchored for the night in 4 fathoms with 70 fms. on the best Bower and 50 on the small; blew off steam and kept fires low, the river apparently well sheltered and very smooth water.
28.62	..	8 P. M.	Gale increasing. Got the steam up and worked ahead full power.
28.45	..	10.00	Gale still increasing, observed the vessel driving with engines working full power and both anchors ahead.
27.80	..	Midgt.	Vessel driving, gave her a little more chain, unable to give her much for fear of the wynch breaking. Midnight blowing a hurricane from S. S. E. the large cog-wheel of the wynch carried away—both chains parted and vessel took the bank. Sea making a clean breach over her, and crew employed baling water out of the vessel, the Flat Matabangah parted from beam lashings, and both banks being inundated, the hurricane blew the vessel about half a mile on the bank, blowing away sails and topmasts, rigging, bamboos, boats, oars, &c.

Saturday, 15th May, 1852.

- A. m. Blowing a hurricane from S. S. E. vessel driving over the thick jungle, sea breaking over her.
- 2.30 Observed vessel stationary—buried in thick jungle, the sea still washing over her.
- 28.30 65 2.45 Gale moderating and veering to the Westward stopped the Engines and blew off Steam.
- 28.65 .. 4.00 Gale veering to N. W. and moderating. Daylight observed the Matabangah high and dry as ourselves, bearing S. E. by S. about 100 fathoms from us; and the nearest bank of the river N. E. by E. about 375 fathoms and nearest to a Nullah N. E. by N. about 275 fathoms. Over-hauled vessel's hold and found no damage done, sent Mr. Smart to the Matabangah, which was found to have a tree through her bottom, which the Commander soon stopped up. Mustered the crew and found all correct. No lives lost, the crew's provisions much damaged.
- 28.92 .. 8.00 N. E. breezes and cloudy, our Jolly-boat being lost, launched the flat boat through a creek and sent Mr. Smart, mate of the steamer and Mr. Wheelan, Clerk of the "Matabangah" with four men from each vessel up to town with reports, and for assistance; commenced clearing away the wreck and jungle.

*Ganges Steam Company's Steamer "CHUNAR" in the Sunderbunds,
May 14th, 1852.*

At 5 A. m. cloudy weather with fresh Easterly winds.

9.45, entered the Fringhee Khall.

10.15, wind increasing with squalls, turned back for an anchorage.

10.40, wind E. N. E. anchored in $5\frac{1}{2}$ fms. kept Steam back for the flood.

3 p. m. Steamer *Berhampooter* with "Bhagrutty" passed on her way to Calcutta.

4, wind increasing to a gale with rain, let go the 2nd anchor and veered to 30 fms.

8, Gale increasing, veered to 50 fms. best bower, 30 fms. on 2nd ditto.

10, Wind East, terrific squalls, wind gradually veering round, thick

rainy weather. Sea washing over all, pumps carefully attended to. Wind S. East, veering to the Southward with squalls, blowing a hurricane at times, vessel drove on to the opposite shore, taking the bank aft, slacked Steam.

Midnight, both boats swamped with the sea washing over them, the roof of the 2nd officer's cabin blown off. Crew employed at the pumps.

Saturday, May 15th, 1852.

0.30 A. M. winds veered to South, the awning deck over foredeck, blew off, taking all the stanchions fore and aft both sides with it into the jungle about 100 yards.

4.30, wind still as violent and vessel shipping great quantities of water, every thing inundated and blowing to pieces.

6, Wind S. E. moderating, got the boats alongside, baled out.

7.30, succeeded in getting the vessel off the bank, weighed and proceeded a little way and anchored. Sent crew to pick some of the wreck of the awning deck.

Observations made at Chandernagore, by Mr. G. B. SMART, Master Pilot, H. C. M.

13th May, 1852.—Sun rose this morning very pale, appearing like a large moon. In the morning Northerly wind; during the day variable from E. N. E. to S. E. Noon Barometer 29.68.

Chandernagore, 14th May, 1852.

Hour.	Bar.	Wind.	Remarks.
Noon	29.47	E. N. E.	All the forenoon Barometer 29.50, wind from E. N. E. and squally with passing showers of rain.
2 P. M.	.42 $\frac{1}{2}$		Ditto Ditto.
3	.41	..	
4	.35	..	
4.30	.32	..	
6	.30	..	
7.30	.28	N. E.	Increasing wind, and squalls more frequent.
9	.24	..	
9.30	.20	..	
10	.17 $\frac{1}{2}$..	
10.30	.15	..	
11	.10	N. N. E.	Blowing very hard, and squalls increasing.
11.30	.5	..	Strong gale and squalls increasing in violence, and in quicker succession.
Midnight	29.0	..	

Chandernagore, 15th May, 1852.

Hour.	Bar.	Wind.	Remarks.
1 A. M.	28.90	North	Gale increasing in violence as well as the squalls.
1.30	.82	..	
2	.77	..	
2.30	.72	..	
3	.68	N. W.	Blowing a fierce hurricane, and squalls in violent gusts, and in rapid succession: The lowest fall of the Barometer.
3.30	.65	..	
4	.69	..	
4.30	.75	..	
5	.80	W. N. W.	Wind and squalls moderating in violence.
5.30	.86	..	
6	.95	..	
7	29.2	..	
8	.10	West	Still more moderate and weather clearing up. Squalls occasionally.
9	.20	..	
10	.27 $\frac{1}{2}$..	
11	.32	..	
Noon	.37	W. S. W.	Moderate wind with fine weather. Barometer rising rapidly.

*Reports from the District of Kishnaghur, from Mulnath Factory,
Lat. 23° 05 $\frac{1}{2}$ ' N.; Long. 88° 46' E.*

The following account of the late Cyclone is contained in a letter from the district of Kishnaghur:—

"We have had a frightful storm here, the mischief done is almost incredible; round this place nearly every tree is either down or injured, and from all the factories I have accounts that nearly every thatched building is quite destroyed. In the villages also it is quite sad to witness the havoc that has been made, trees and houses all lying in one grand chaos. Great numbers have received serious injuries, and there has also been a very serious loss of life. On Friday it blew pretty fresh all day, with the Barometer gradually falling. In the evening the wind increased, and about 12 o'clock the hurricane began in earnest. It was worse between 4 and 5 o'clock—the wind then from the N. W. and Barometer standing at 28.4 where it remained till a quarter-past 6, when it rose to 28.6. At a quarter past 7 to 29, quarter-past 8 to 29.2, at 9 o'clock to 29.3, and at half past 10 to 29.4 when the storm broke, though it blew violently till noon. I think we must have had it here more severely than even you have had it in Calcutta—though you appear to have had it badly enough. In this concern, thirty people have been killed, and I have just heard that my boat, which I had sent for a friend, has gone to the bottom,

and that a poor chuprassee and four of the men have been drowned."—*Calcutta Englishman.*

Letter from Kishnaghur from Major LANG, 36th N. I.

Lat. 23° 26' N.; Long. 88° 35' East.

I greatly regret that I cannot furnish any Barometer register, but perhaps the following account of the storm, as experienced at this station, may be acceptable.

Throughout the whole of Friday the 14th instant, the weather was unseasonable, with heavy clouds and the wind hanging to the North of East; there were occasional squalls during the day. Towards evening, although appearances continued threatening, the wind was moderate and remained so till about 9 p. m. when it began to freshen considerably.

Up to this time I think the wind was variable, changing a point or two towards the North and falling back again to East. At 10 o'clock the storm may be said to have commenced;—the wind then blew in strong squalls from about E. N. E. gradually veering to the North. By midnight it was due North, and from this point it continued to blow with great fury for several hours. At times there was heard a low rumbling noise, which might well have been mistaken for thunder, but I believe it was the effect of the wind; there was no lightning.

From 2 to 4 a. m. of the 15th, the hurricane was at its height; it then, as far as I could judge, blew from two or three points to the West of North. The gusts at times were crushing, and it seemed as if nothing could withstand their force; they were accompanied with a continuous driving rain. At day-break there was a scarcely perceptible decrease in the fury of the storm. The clouds lay very low, and the scud was borne along with great velocity, the rain continued at intervals. From sunrise the gale gradually moderated, although up to 12 o'clock there were occasional squalls, which, but for what had preceded them, would have been thought unexampled in their violence.

At 6 a. m. the wind was W. N. W. veering slowly to the West from which point it continued to blow freshly till the afternoon when the weather cleared up.

Letter from Katgurrah, from R. P. SAGE, Esq.

Lat. 23° 16½' N.; Long. 88° 57' East.

Saturday, 8th May.— a. m. cloudy. Wind S. W. moderate, very heavy rain for two hours from S. E. night strong S. E. wind.

Sunday, 9th May.—A. m. weather clear, with strong S. E. wind. Noon wind S. W.; p. m. very hot, atmosphere hazy; 6½ p. m. a wind, stormy appearance to the N. W. night close and cloudy.

Monday, 10th May.—A lurid haze prevailing throughout the day. Wind high, variable N. E. to S. W.; p. m. high wind throughout the night.

Tuesday, 11th May.—The same as yesterday.

Wednesday, 12th May.—Atmosphere somewhat clearer, wind as yesterday.

Thursday, 13th May.—A. m. heavy clouds to the South. Wind S. E. and blowing strong throughout.

Friday, 14th May.—A. m. heavy black clouds all round, wind blowing very strong from the East all day. P. m. cloudy; 7½ p. m. wind increasing till 11 p. m. when it blew a hurricane from the Eastward, midnight wind from N. E. with much rain.

Saturday, 15th May.—1 a. m. gale blowing with tremendous force, trees and houses falling in all directions; gale continued with unabated force till 5 a. m. when it lulled slightly and the wind veered round by the North to the West, whence it blew very hard till near 9 a. m. whence the wind fell considerably, and at 10 a. m. the rain ceased. 3 p. m. wind high from S. W.

Sunday, 16th May.—Light S. W. b. S. wind, with very hazy atmosphere.

Monday, 17th May.—A. m. clear, few clouds about, wind S. E.; 9 p. m. a North Wester with a shower of rain.

The whole country round wears a most desolate aspect.

Report from the road from Jessore towards Calcutta.—By

G. F. COOPER, Esq.

Being at Jessore during the late storm and returning thence direct by dák to Calcutta on Friday last I was enabled to make a few observations which, though in all probability, you are already acquainted with, I will endeavour to lay before you.

During the whole of the previous day we had a high East wind at Jessore which increased during the night to a perfect hurricane. At or before break of day the storm was at its greatest fury, the wind being then from the South East, later in the day and when the storm had abated, the wind was N. Westerly.

For some twenty miles the South side of Jessore, the storm, *judging from the fallen timber*, appears to have taken the same course, but after passing that distance or say thirty miles from Jessore, the current appears

to have entirely changed ; all prostrate timber, &c. lying N. Westerly, the direction of the current being diametrically opposite to that experienced at Jessore. This at once indexes the centre of the Cyclone as being mid-way between the distances I have named.

Perhaps I have not expressed myself in a very lucid manner, and will venture upon reiterating my statement ; at Jessore and for twenty miles or so on the road to Calcutta, the fallen trees were lying across the roadway from *left to right* (S. E. to N. W.) then after passing that distance I found them lying from right to left (N. W. to S. E.) The road, as you may be aware, being in a straight line running to the N. E. from Calcutta, and the intermediate distance between the two places being eighty-six miles.

The points of the compass I have named, you will please to consider as *about* the direction from whence the wind blew and not restricted to a few degrees.

EDW. THEO. COOPER.

P. S.—Great ravages were committed by the storm. At the spot I have surmised as the vortex, I observed a *prostrate* banyan tree, whose stem could not measure less than 25 feet in circumference.

Jessore, Lat. 23° 9' ; Long. 89° 12' East.

The following is from Jessore :—“ During Thursday 13th, fresh breeze from the Eastward with cloudy appearances. 6 p. m. wind steady at about E. N. E. with very threatening appearance. At 11 p. m. fresh gale from ditto with occasional smart squalls. From 2 A. M. till 6 A. M. of the 14th, a regular “hurricane” with rain. At 6.30 A. M. wind shifted round to W. S. W. and came down with great fury, carrying every thing before it. At noon moderate Southerly wind, with occasional showers of rain. At 4 p. m. weather fine. During the gale of the 14th, Friday, every hut has been levelled to the ground, killing natives without number. The abkaree office blew to pieces ; all the stables in the station ditto ; pucca houses have suffered greatly, windows, glasses, sashes, &c., all blown away, trees of many years standing are now laid flat on the ground. Such havoc has not been witnessed in Jessore for many a year.”

Extracts from a letter from Muddendarrie Factory, district of Dacca, Lat. 23° 28' N. ; Long. 89° 40' East.

“ I observe by your Monday’s *Englishman* that with you the gale commenced from the N. N. E. at 1.30 A. M. of the 14th, and your first rain-squall occurred at noon of the same day. With us it was quite different, for

there was scarcely any wind at all, till sunrise on the 14th, when a strong breeze from the East sprung up, and continued all day, the day being bright and clear, so much so, indeed that I never once thought of a gale being so very near at hand. I retired to my bed at my usual early hour, and slept soundly till midnight, when I perceived that the wind had somewhat increased; but still there was no rain, and I in consequence thought not of a gale. At half-past 2 A. M. 15th, I was roused up by a crash in the verandah, and the clapping and banging of doors and windows all over the house. I ran into the Southern verandah, through which I found the wind and the well known storm sleet was rushing like a torrent, announcing at once what was probably in store for us. I made all snug, and prepared for a blow, and a blow we had with a vengeance. From 3 A. M. of the 15th till 6 o'clock, it blew as hard as it could, and from 6 till 9 it blew still harder! My house is a very strong *pucka* one, yet it shook from end to end under each sounding shock it received from the terrific gusts of wind; doors, windows, sun-shades, venetians, &c. &c. were blown in and out, and sent flying all round the factory like shreds of brown paper, trees were torn up by the roots, sheds and houses laid low. The river which had risen 6 feet, lashed its banks in fury, till the said banks came toppling over with a tremendous splash and surge, to add to the general confusion. During all this time the wind was veering from East to South East, to South; at 9 it went round to South, then to S. W., and eventually (at about 1 P. M.) died away at West. Since the gale we have had one S. Wester and two North-Westers, accompanied with heavy rain."

*The following is an extract of a letter from Malda, Lat. 25° 03' N.
Long. 88° 04' East, 20th May.*

The following is an extract of a letter from Malda, 20th May:—

“The Cyclone noticed in your paper of the 17th instant visited this district, but as its centre must have passed considerably to the Eastward of us, little damage has been done to our plant.

“Not being in my own house during the gale, I could not notice the Barometer, which I much regret.

“14th May.—On the afternoon it was evident enough that bad weather was in store for us, but as we were much in want of rain to refresh our drooping plant, the heavy clouds were hailed with delight. The heaviest looking clouds were towards the South-East, and were accompanied with vivid lightning. I noticed nothing more, and it was only when I rose on the morning of the 15th, that I was aware that a Cyclone was passing over, the centre of which must be some distance to the Eastward.

" 6 a. m.—Blowing a strong gale from the N. N. East, and rain, not very heavy.

" 8 a. m.—Wind increased, some of the gusts very heavy, North by East.

" Noon.—Blowing from due North, rain heavy.

" 3 p. m.—The wind had veered to about N. N. W., and its force considerably moderated, rain less heavy.

" 5 p. m.—The gale had evidently broken, the blue sky appearing in places and the wind now blowing in occasional gusts, greatly fallen, its direction being nearly due West.

" The loss of boats on the Ganges near this has been very great, but the Indigo has sustained no damage, the greater portion being too small to receive hurt."

Report from the station of Furreedpore, Jessore, Lat. 23° 36 $\frac{1}{2}$ ' N.;

Long. 89° 51' East.—By T. B. MACTIER, Esq. C. S.

For several days preceding the storm, the weather was exceedingly stormy, and during the 14th, there was a good deal of wind which however, died away, and in the evening it was exceedingly sultry with a very threatening sky. I may here observe that for three days previous to the storm the prevailing winds were Easterly! About 9 p. m. a moderate breeze sprung up from East which veered Northwards, and at 11 p. m. the wind was N. N. E., it then went back again gradually increasing in violence until it reached S. East which it did at 7.30 a. m. (15th) when it was at its greatest height, it then went Southwards, gradually decreasing in strength and died away to a moderate breeze about 6 p. m. (15th) at which hour the wind was W. S. W.

The Barometer and Thermometer stood as follows:—

	Bar.	Ther.
15th.—½ p.	6, 29.154	79.8
½ p.	7, 29.134	79.2
9,	29.176	78.4
¼ p.	10, 29.258	78.4
½ p.	5, 29.474	79.4

The damage done to houses and trees was very great, but it did not appear so violent as the storm which visited the Bancoorah district in April, 1850, an account of which I think sent you.

From the native accounts, the storm was most severe between this and Dacca, and in Pergunnah Vikrampur near the junction of the Kirtinassa and Megna, the sea is said to have rolled over the land in a wave 7 $\frac{1}{2}$ feet high. I am doubtful of this however.

Report from Rampore Bauleah, Lat. 24° 22 $\frac{1}{2}$ East; Long. 88° 36' East.—By J. R. BEDFORD, Esq. Civil Asst. Surgeon, H. C. S.

On the 14th.—At 4 p. m. the Barometer stood at 29.644; at 4h. 30m. p. m. a South-Easter came up in one heavy roll of steam-like clouds which hung low, and occupied but half an hour in travelling from one visible horizon to the other. It was accompanied by a stiff gale.

At 12 at midnight the Cyclone began from N. E. veering to N. at 2 a. m. of 15th; and between that and 7 a. m. to N. W. It travelled round to W. as the day advanced and blew from S. at 9 p. m.

I was unable to note the Barometer until 7 a. m. from which time its hourly uncorrected reading was as follows:—

Hour.	Newman's Standard Barometer.	Attached Thermometer.	Direction of wind.
7 a. m.	29.240	77°	N.
8	.214	77	N.
9	.140	77	N.
10	.066	77	N.
11	.036	77	N.
12	.088	77	N.
1 $\frac{1}{2}$	.232	78	N.
2	.276	78	N. W.
3	.320	79	N. W.
4	.354	79	N. W.
5	.428	79	N. W.
6	.480	79	N. W.

The wind's force began to diminish simultaneously with the rise of mercury but blew with a force of 6 (Admiralty symbol) as late as 6 p. m. At 9 p. m. it had veered to South and was very moderate.

Throughout the gale the sky was one mass of nimboid cloud. The total fall of rain during the 24 hours of its continuance, was 3.35 inches. No thunder was heard or lightning seen, but the noise of the gale and density of clouds were sufficiently great to have masked either one or the other.

About 150 huts have been destroyed, but as far as I am aware there has been no loss of human or animal life on land in this neighbourhood.

The destruction of property appears to have been much greater in the Southern and Eastern part of the zillah.

Report from Jeypoor Bogoorah, Lat. 25° 15' N.; Long. 89° 03' E.—

By J. W. PAYTER, Esq.

May 14th.—9 p. m. till midnight wind strong from the East, gradually increasing.

15th.— $2\frac{1}{2}$ A. M. wind rising rapidly to a gale at 5 A. M.; at 6 A. M. a perfect hurricane from the N. N. E. and continuing without intermission in gusts till $2\frac{1}{2}$ P. M. with continued rain in sheets—at the latter hour it moderated and the rain ceased; people in the villages peering out to see the extent of their own and neighbours' losses, but there was not much time afforded for examination, for by 4 P. M. the wind had again got up in the opposite quarter W. N. W.; and at 6 P. M. was as furious as before till 9 P. M. when it began to subside, until $10\frac{1}{2}$ P. M. when it settled into a steady light breeze from S. E.

16th.—Cloudy, with the same Southerly wind till 9 P. M. when we had another storm (without rain) from the S. West.

17th.—The sky still very cloudy, country deluged with the rain water.

Report from Bancoorah, Lat. $23^{\circ} 14'$ N.; Long. $87^{\circ} 05'$ East.—

By G. N. CHEEK, Esq.

As we are having a gale I send you the particulars of what has occurred here. On the 13th May, P. M. I find in my note book, the following remark: "I shall not be at all surprised again to have a May gale," on the morning of the 14th we had East winds in rather strong puffs, which had been the case during the night of the 13th. 3 P. M. 14th, wind strong in puffs, with occasional showers and heavy masses of clouds going to the West; wind at 3 P. M. E. N. E.; since 5 P. M. the wind shifting about S. E. to S. W. 9 P. M. wind at West, with very slight drizzling rain and wind in puffs. 15th, wind shifted on the night to W. and N. W. with slight rain in the morning, and blowing hard to the W. a little inclining to N.; half-past nine clearer but wind appears on the increase, wind continued till near 2 strong at times from W. b. N., with heavy clouds. 3, wind lulled and the sun came out, wind rose again at $3\frac{1}{2}$ with dark clouds to the North-West; about 4, it was quite calm with clouds and very close.

I am of opinion there has been a severe storm in Lower Bengal, and although we had but little here, it may help you, even though what I write may be of little worth.

Report from Dinagepore, Lat. $25^{\circ} 37\frac{1}{2}'$ N.; Long. $89^{\circ} 40'$ East.—

By G. YULE, Esq.

On the evening of the 14th inst. a heavy bank of clouds was seen rising in the South-East, the rest of the sky being clear. During the night a

moderate breeze arose accompanied by light rain and continued till nearly 7 A. M. of the 15th, when it lulled for an hour and then commenced blowing from the North-East and rapidly increasing in strength as it veered round to the North-West till 3 P. M., at which time it began to moderate, and it ceased almost entirely as it became nearly due West about 6 P. M. Below are the registerings of an Aneroid Barometer of which, unfortunately no note was taken till noon of the 15th, when it was observed to be rapidly falling. Of two common Barometers at the station, one fell to 28.90 the other only to 29.20.

15th noon,	Aneroid	29.30
2 P. M.		29.17
3 ditto.		29.14
3½ ditto.		29.11 this was the lowest, and after rising some time
6 ditto.		29.16 here a very slow rain commenced.

Notes from Chilacall, 15 miles N. of Rungpore Civil Station.—

Lat. 25° 52' N.; Long. 89° 39' E.—By T. SANKEY, Esq.

May 15th, 1852.—At sunset last night a heavy bank of clouds rising in the S. W.; commenced raining at 8 P. M., continued all night with Easterly wind blowing hard and in gusts; at daylight rain and ditto wind.

8 A. M.	Ther.	78½	Bar.	29.51
Noon	..	.45	Wind N. E. and heavy squalls.	
1 P. M.	..	.34		
2 ditto	..	.25	Wind shifting to N. in terrific gusts.	
2½ ditto	76	.23		
2½ ditto	..	.21	N. by E.	
3 ditto	75	.15		
3½ ditto	..	.12		
5 ditto	..	.16	The gusts somewhat less violent.	
Dusk	..	.19		
7 P. M.	..	.23		
8 ditto	..	.36		
9 ditto	..	.41	Wind going down, succeeded by torrents of rain.	
9½ ditto	..	29.45	Squally.	

Storm ceased about midnight.

16th May.—Daylight Bar. 29.55

2 P. M.	.63	Ther. 86.
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14th May.—2 P. M. 29.67 86

5 ditto	.58
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Report from Gowalparah, Lower Assam, Lat. 26° 11 $\frac{1}{2}$ ' N.; Long. 90° 37' E.—By W. POLLOCK, Esq. to Col. JENKINS, Agent Govr.-Genl.

The gale commenced here on the morning of the 15th, at 11 A. M. the sky looking exceedingly cloudy and dark from the Eastward, with the wind from the N. E. and gradually increasing in violence till 2 P. M. when it blew a perfect hurricane, and just about that hour the roof was completely blown off the bungalow usually occupied by the officer commanding the Detachment here, but most fortunately no person was in the house at the time. The wind continued from the same quarter accompanied with heavy rain till 4 P. M. when the gale somewhat subsided and the sky looked clear, but in about an hour afterwards the wind commenced to blow stronger than before, but shifted its course from N. E. to N. N. E. and continued strong and steady till 1 A. M. on the following morning (Sunday) when the wind suddenly veered round to the Southward and soon afterwards to the S. W.; the gusts from the S. W. were really awful, and continued with but little intermission till 3 P. M. when the gale gradually subsided. I regret to say that four or five men were drowned in attempting to cross the river, and about forty boats lost, containing a large quantity of salt, rice, &c. &c. the property of the Kyens in the bazar. The most remarkable feature in the storm was its continuing so long and so strong, and so suddenly shifting its course from the N. E. and N. N. E. to the S. S. W. *The gale was not accompanied by thunder or lightning.* The quantity of rain which fell was 3 $\frac{1}{2}$ inches.

I am sorry to say we have no Barometer at the station, the Thermometer ranged from 74 to 78°, and the weather for the last four or five days has been exceedingly warm. The Ther. 90° in the shade and 128° in the sun at 4 P. M.

Notes of the Gale at Gowhatta, Lat. 26° 10 $\frac{1}{2}$ ' N.; Long. 93° 46'

E.—By Lt.-Col. JENKINS.

14th.—A close and sultry day, sky covered with thin dark clouds, which partially obscured the sun.

At sunrise, Barometer	29.578
9h. 40m.	.596
12 P. M.	.572
2h. 40m.	.479
4 P. M.	.456
Sunset,	.492
Sunrise, Thermometer	78.3
Noon,	82.5
Sunset,	83.5

Prevailing wind N. E.

15th.—Very dark and lowering sky, stormy-looking clouds in dark ragged masses. A shower about $5\frac{1}{2}$ A. M., wind from N. E. After 10, wind began to rise, and from 12, blew a gale with heavy rain (which commenced at 1) from the N. E.

Night stormy and wet.

At sunrise, Barometer	29.450
9h. 50m.	.462
Noon,	.427
2h. 40m.	.419
4 P. M.	.380
Sunset,	.320
Sunrise, Thermometer	78°9
Noon,	79.7
Sunset,	78.

No serious damage done by the gale.

Barometrical Observations from Nursingpore in Central India, Lat. 22° 57' N.; Long. 79° 38' bearing about W. $\frac{3}{4}$ S. from Calcutta.—By C. G. E. FORD, Esq.*

Some atmospheric perturbation at this station appears to have preceded the Cyclone in Calcutta, as the Barometers suffered some considerable depression on the 12th and 13th, being at Noon on the

11th	28.680
12th	.685
13th	.664
14th	.651
15th	.662
16th	.671

But we can scarcely suppose from the track of the storm that it was in any way connected. To the Eastward on the Coast of Arracan the Barometer does not appear to have been affected either before or during the Cyclone.

I now proceed to give as usual in these Memoirs, the comparative Tables of wind and weather on the different days in which the Cyclone was felt in various parts of the Bay and on its inland progress.

* Its elevation above Calcutta, I am unable to give.

Comparative Table of Winds and Weather, from the 12th to the 15th May, 1851. Sunderbund Cyclone.

<i>Date.</i>	<i>Name of Ship or Station.</i>	<i>Lat. North.</i>	<i>Long. East.</i>	<i>Winds and Weather.</i>	<i>Bar.</i>	<i>Symp.</i>	<i>Ther.</i>	<i>Remarks.</i>
1852. 12th May.	Amazon,	16° 41'	85° 07'	8 p. M. gloomy. Noon threatening to midnight.	Midnt. 29.68 65	29.54 46	86° 86	Lightning to S. Eastward. Confused sea getting up at midnight.
	London,			Wind S. Westerly and at midnight North.				
				A. M. Wind variable. Noon N. East; 4 p. M. N. East.	..	..	..	Ship running to S. W. to 6 p. m. Heavy sea. Howe to.
				6, p. M. heavy gales with violent squalls. 10h. 30m. Hurricane, North.				
13th May.	Eneas,	15 38	85.42	W. S. W. to W. N. Overcast Aneroid.	29.75 29.62	29.72	87°	Much lightning all round particularly to S. Easterly, Westerly swell.
	Limehouse,	16.42	86.36	A. M. W. N. W.; p. M. West, strong breeze increasing throughout.	29.785 ..	..	82	Heavy head swell. Mid-night blowing very heavy. Ship running to the North-ward.

Date.	Name of Ship or Station.	Lat. North.	Long. East.	Winds and Weather.	Bur.	Symp.	Ther.	Remarks.
13th May.	Amazon,	17° 21' N.	85° 49' E.	A. M. N. N. W. increasing; Noon N. W. P. M. W. N. W. West and S. W.	4 A. M. 29.57 .42 .30 .38 .36	29.40 82.5 83 83.5 84	85° 82.5 83 83.5 84	Threatening from sunset of the 12th. Noon high tumbling sea. Terrific squalls; kept away to S. S.E. to avoid Cyclone. Midnight hove to.
	London,	No obser-		Hurricane; 4 A. M. N. West; 9 A. M. West; 11 A. M. W. S. W.	..	..	..	2.30 A. M. lost mizen-mast and cut away main-mast. Hurricane to midnight.
	Adelaide,	19.27		Noon North; P. M. increasing to a gale; 8 p. m. heavy gale N. N. W.; Midnight N. W. b. W.	Noon 29.57 Midnt. 29.39	29.25 29.10	86 86	Noon head swell. P. M. the same from Eastward. 8. P. M. bore up to run out of the Cyclone. Running to the S. b. E.
	Precursor, Steam Vessel,	15.28		Heavy dull weather, light North and N. East wind, veering to East and S. East.	6 p. M. 29.68	6 p. M. 29.41	88	Swell from N. W. making preparations for bad weather.
	FALSE POINT LIGHT HOUSE.	20.19	86.44	Wind N. East to N. W. at midnight.	29.70	..	86	Squally with cross scud flying, and falling Barometer.

Balasore,.....	21°.28'	87°.00'	S. E. slight rain, cloudy to E. S. E. and E. N. E.	..	..	92
H. C. F. L. V. Star, Eastern Channel,.....	21.4	88.14	r. m. wind E. b. N. gradually increasing.	..	..
H. C. P. V. Sal- ween,	20.56	88.05	Fresh Easterly breeze. Midnight E. N. E.	29.69 to 29.56	..	85 to 86
H. C. P. V. Saugor, Pilot Ridge Station.	20.49	87.49	Daylight threaten- ing. Noon strong E. N. E. breeze. Mid. and night hard gale N. East.	29.61 to .66 .53	..	83
H. C. F. L. V. Hope, Gasper Sta- tion.	21.26	88.04	8 A. M. fresh Easterly winds. Midnight E. N. E.	29.58 Midnht.	..	85
Easurain, .....	..	..	Wind E. N. E.	29.70	..	83
CHANDERNAGORE,	22.51	88.29	A. M. Northerly dur- ing the day variable E. N. E. to S. East.	29.68	..	85
Katgoorah,.....	23.16½	88.57	A. M. heavy clouds to South, wind S. E.	..	..	Strong S. Eastly breeze throughout.

Date.	Name of Ship or Station.	Lat. North.	Long. East.	Winds and Weather.	Bar.	Symp.	Ther.	Remarks.
14th May.	Eneas,.....	17°.49'	87°.05'	W. b. N. to N. W. more from W. N. W.	A. M. 29.62 P. M. 55	29.66 .55	.850	Aneroid A. M. 29.55. P. M. 29.45; 9 p. M. a short sea from N. Eastward felt. Sheet lightning all round.
	Limehouse,.....	17.09	86.20	2 A. M. heavy gale West; 5 A. M. S. W.	Noon 29.685 7 p. M. .550 10 p. M. .450	29.30 .. .10	82 80 79	2 A. M. hove to, terrific squalls; 6, bore up heavy cross seas, 10 p. M. hove to again. Incessant lightning
	Amazon,.....	16.50	87.13	6 A. M. S. W. P. M. W. S. W.; 4 P. M. S. W.	29.64	29.56	82	6, Moderating a little but terrific squalls at 7 A. M., P. M. bore up. 4 p. M. Gale much diminished.
	London,.....	16.41	89.40	4 A. M. more moder- ate W. S. W.; latterly wind S. W.	..	..	..	Ship dismasted and water- logged. Abandoned on the 16th in Lat. 17° 35' N.; Long. 90° 40' East.
	Adelaide,	18.45	87.23	A. M. N. W. b. W. heavy gale; 4 A. M. N. W.; 5 A. M. W. N. W.; 9 A. M. West. P. M. hard gale.	29.34	29.00	81	Ran to S. b. E. and S. East, and hove to.

14th May.	Precursor Vessel,	17°.46'	83°.48'	Squally and dark from N. W. to North and S. East, p. m. veering to S. W. and West and S. S. W. and p. m. fresh gale at times.	From 29.63 to Noon 29.65 and p. m. 29.70	29.50 .54	..	Reduced speed at 4 A. M. to avoid the Cyclone. Heavy bank and swell from N. East Set of 65' to the East from noon 13th. Stood back to the S. East at 9 p. m.
	False Point, Light House,	20.19 $\frac{1}{2}$	86.44	N. W. Noon North; 5 p. m. S. East; 6 to .38 S. S. East. Midnight and .50 West.	29.52	..	..	Steady gale from N. W. to Noon. Gale broken at 6 p. m. Wind S. S. East. Confused sea in the offing.
	Balasore,	21.28	87.00	A. M. N. E. Noon North. Stiff breeze N. N. W.; 6 p. m. N. W. Midnight W. N. W. and W. S. W.	29.45 2 p. m. .36 5 p. m. .29 Mid.33	..	..	Heavy dense bank of clouds to the E. N. E.
	H. C. F. L. V. Star,	21.04	88.14	Blowing a hurricane veering to N. W. at Midnight.	..	..	..	Barometer stated to have fallen to 28.36!
	H. C. P. V. Cavery,	20.49	..	A. M. fresh gale N. E. to East, increasing to a hurricane from N. N. W. to N. West. p. m. N. W. to West; 8 p. m. W. N. W.	29.54 to 28.64 and 29.50	..	..	Standing to sea from Pilot's ridge station. 12 p. m. Cut away mainmast. Barometer rising from 2.30 p. m.

<i>Date.</i>	<i>Name of Ship or Station.</i>	<i>Lat. North.</i>	<i>Long. East.</i>	<i>Winds and Weather.</i>	<i>Bar.</i>	<i>Symp.</i>	<i>Ther.</i>	<i>Remarks.</i>
14th May.	H. C. P. V. Sa- ween,.....	From 20° 05' to 20.10	88°.05' 88.06	Daylight gusty N. E. Noon hurricane N. N. E. by 6 p. m. West. Midnight W. S. West moderating.	29.50 to 28.72 and 29.50	80	85	Standing to S. East, and hove to at 8.30 A. M.
	Saugor P. V. Pi- lot's ridge,	20.49	87.49	Hurricane E. N. E. to N. E. Noon N. E. 4 p. m. N. b. W. Midnight N. West and fast abating.	29.48 to 28.96 and 29.28	..	83	Rode out the gale on the Pilot's ridge with 210 fms. of cable.
	H. C. F. L. V. Hope, Gasper Station.	21.26	88.04	Daylight strong N. E.; 11, gale at N. E. Noon N. E.; 8 p. m. N. b. W.; at 9, N. W. b. N. Midnight hur- ricane.	29.60 to 28.98 and 29.70	..	..	Vessel driving at 8 p. m.; Bar. lowest at 8 p. m.
	H. C. B. V. Grap- pler,.....	At Saugor	..	A. M. fresh E. N. E.; 8, heavy E. N. E.; Noon gale N. E.; 4, N. N. E.; 8, North. Midnight North.	29.78 to 29.72	..	..	At midnight, gale still increasing.

Easurain, .....	..	A. M. N. East squally; 10 p. m. to midnight hurricane from North in terrific squalls.	29.60 to 29.40	..	At anchor as before. Saugor Flat Buoy.
Diamond hour,	88°.12 $\frac{1}{4}$ '	From Noon to 6 p. m. blowing violently at 7 p. m. from East to midn.	29.08 to 29.45	..	Report imperfect.
P. and O. S. N. Compy.'s Ship Hindostan,	22°.11 $\frac{1}{4}$ '	Noon E. N. E. Midnight North.	29.58 Noon 29.03 Midngt.	88°	..
CALCUTTA,	22°.34'	Daylight fresh breeze N. E. Noon E. N. E. and N. E. 5 p. m. N. N. East; Midnight about North, hard gale.	29.74 to 29.17	..	A. M. heavy bank, East to N. East.
THE SUNDER- BUNDS; Berham- pooter Steamer.	21.54	4 A. M. strong East- erly winds to Noon; 4 p. m. E. S. E. in- creasing. Midnight hurricane, S. S. East.	..	29.50	..
THE SOONDER- BUNDS; Chunar Steamer. ....	..	From 5 A. M. increas- ing Easterly breeze; 10.40 A. M. E. N. E. 10 p. m. East gales and terrific squalls, veering South Easterly.	..	..	Midnight hurricane, boats swamped, and vessel on shore in the jungles.

Date.	Name of Ship or Station.	Lat. North.	Long. East.	Winds and Weather.	Bar.	Ther.	Symp.	Remarks.
	CHANDERNAGORE,	22°.53'	88°.20'	A. M. wind E. N. E. squally and passing showers; 7.30 p. m. N. E. increasing; 11 to midnight N. N. E.	From 29.50 to 29.47 and 29.00	..	..	Increasing from 7.30 p. m. to strong gale with heavy and frequent squalls.
	KISSEN NUGGUB, ..	23.26	88.35	Variable N. to East; 10 p. m. E. N. E. blowing fresh and strong squalls. Midnight North furious gale.	..	..	..	..
	KATGURRAH FACTORY, ..	23.16½	88.57	Strong breeze from the East all day; 7½ p. m. increasing; 11 p. m. hurricane. Midnight wind N. E.	..	..	..	..
	RAMPORE BAU-LEAH, ..	24.22⅓	88.36	4.30 p. m. A South Easter followed by a stiff gale. Midnight Cyclone commenced from N. East.	29.64 4 p. m.	..	..	..
	JEYPORE BOGO-RAH, ..	25.15	89.03	9 p. m. till midnight strong increasing East- ly breeze.	..	..	..	..

14th May.	BANCOORAH,	23.14	87.05	3 p. m. Wind in strong puffs from E. N. E.; 5 p. m. wind S. East to S. West; 9 p. m. West.	.. .. .. ..	Night of 13th, Easterly winds in puffs. p. m. 14th May, light drizzling rain.
	DINAGEPORE,	25.37 $\frac{1}{2}$	87.40	Evening a heavy bank of clouds coming up in the S. East. Night moderate breeze and light rain.	.. .. .. ..	.. .. .. ..
	GOWAHATTY, Assam,	26.10 $\frac{1}{2}$	93.46	Prevailing wind N. East.	29.57 to 29.49	Close sultry day.
15th May.	Eneas,	Pilot Station.	..	S. W. and South.	29.73	86°
	Limehouse,	17.59	87.22	S. W.; 8 A. M. S. W. b. W. Noon S. W. more settled.	29.83	Barometer rising and falling to the weather; 8 A. M. Bore up. Confused sea.
	Adelaide,	19.27	87.12	A. M. S. W. decreasing gale.	29.58	Noon fine and strong breeze. Set of 48 miles to the W. b. N.

Date	Name of Ship or Station.	Lat. North.	Long. East.	Winds and Weather.	Bar.	Symp.	Ther.	Remarks.
15th May.	Precursor Steam Vessel,	19.31	87.10	A. M. strong S. S. Westerly breeze. Sea going down.	29.75	29.62	86'	Noon standing on full speed.
	BALASORE,	21.28	87.00	6 A. M. S. W. finer breeze and pleasant.	29.50	..	83	..
	F. L. V. Star, ..	20.55	..	A. M. hurricane from N. W.	..	..	..	In 25 fms. water to the W. S. W. of the station.
	Easurain, .....	..	..	A. M. gale N. N. W. heavy sea. 3 A. M. W. N. W. Daylight W. S. W.	1 A. M. 29.20 29.40	..	..	Driving from Saugor Flat Buoy on shore; at 2 A. M. at Saugor Point.
	H. C. B. V. Grappler, Saugor, ..	..	..	From 1.30 to 2.30 gale at its height. 2 N. N. W.; 10.30 S. S. West moderate and fine.	29.21 to .20 and 29.70	..	..	5 A. M. gale moderating fast.
	H. C. F. L. V. Hope, Gaspar Station,	21.26	88.04	1 A. M. W. N. W.; 2 to 4, moderating.	29.38 to 29.70 at 8 A. M.	..	..	Gale moderate at 5 A. M.

15th May.	DIAMOND BOUR,	22.11 $\frac{1}{4}$	88.12 $\frac{1}{4}$	1 A. M. N. W. hurricane to 4 A. M.; 6 A. M. West.	29 54 to 29.55	..	83°	Report imperfect.
								Force of wind not given.
P. and O. C. S. Hindostan, Gar- den Reach, ....	..	..	2 A. M. N. W.; 4, West to W. N. W.; Noon W. b. N.	28.84 to 29.48	..	..	75	
CALEUTTA,	22.34	88.22	4 A. M. Wind N. Westerly; 7 A. M. West.	28.82	29.28	81 $\frac{3}{4}$	80	
THE SUNDER- BUND, BAGUN- DEE.	22° 38'	88° 57'	Gale at E. N. E. but veering fast to the Southward.	..	..	..	..	At 2.15 A. M. hull for about ten minutes and shift from E. b. S. to S. West.
THE SUNDER- BUND, BER- HAMPOOTER STR.	21.54	89.02	Hurricane from S. S. E.; 2.45, veering to the Westward.	..	..	..	..	Vessel driven on shore.
THE SUNDER- BUND, CHUNAR STR, .....	..	..	0.30 A. M. wind veer- ed to South; 4.30, still violent; 6. S. E. moderating.	..	..	..	..	Vessel on shore, 7.30 got off.
CHANDERNAGORE,	22.53	88.20	A. M. North; 3, N. W.; 5, W. N. W.; 8, West. Noon W. S. W.	28.90 3 A. M. .65 Noon 29.37	..	..	..	Increasing in violence; at 3 A. M. a fierce hurricane. At 5 moderating to Noon.

<i>Date.</i>	<i>Name of Ship or Station.</i>	<i>Lat. North.</i>	<i>Long. East.</i>	<i>Winds and Weather.</i>	<i>Barr.</i>	<i>Symp.</i>	<i>Then.</i>	<i>Remarks.</i>
15th May.	KISSENNUGGUR, ..	23° 26'	88° 35'	At 4 A. M. about N. N. W.; 6 A. M. Wind W. N. W.	..	..	..	Hurricane at its height from 2 to 4 A. M. moder- ating from sunrise.
	KATGORRAH FACTORY, ..	23.16½	88.57	1 A. M. tremendous gale N. E.; 5 A. M. slight lull and veered by North to West; 9 A. M. moderating; 3 p. M. wind high from S. W.	..	..	..	At 1 A. M. trees and houses falling in all directions.
	MALDA, ..	25.03	88.04	6 A. M. strong gale N. N. E. and rain; 8 A. M. increasing N. b. E.; Noon due North. 3 p. M. N. N. W. mo- derating to 5 p. M. when wind West.	..	..	..
	FUEREDPORE, ..	23.36½	89.51	7.30 A. M. S. Tasty. gale, veering South- easterly.	29.154 to .134 and .474	..	79.8° 78.4 79.4	Gale at its greatest height at 7.30 A. M. On the 14th, moderate breeze, Easterly and N. N. East.

15th May.	RAMPORE LEAF,	BAU- RAH,	24° 22'½	88° 36'	A. M. wind from N. E.; 2 A. M. North to 1½ P. M. 2 p. m. N West; P. M. West; 9 P. M. South.	29.240 .. 29.636 11 A. M. 29.46 6 p. M.	.. .. .. .. ..	Rain in sheets during the gale.
			25.15	89.03	2½ A. M. rising rapid- ly to a gale. 6 A. M. hurricane from the N. N. E.; 2½ h. hull; 4½ wind W. N. W.; 6½ hurricane till 9 p. m.; 10, light breeze S East.	.. .. ..	
	JYPOOR, RAH,							
	BANCOORAH,		28.14	87.05	Wind shifting in the night to W. and N. W. slight rain, wind veer- ing by West to North. 4 p. M. calm.	.. ..	
	DINAGEPORE,....		25.37½	89.40	7 A. M. lulling for an hour and commenced blowing from the N. East, veering to N. W. by 3 p. m. when mo- derating.	.. .. 29.30 to 29.11		Gale of no extraordinary violence.

<i>Date.</i>	<i>Name of Ship or Station.</i>	<i>Lat. North.</i>	<i>Long. East.</i>	<i>Winds and Weather.</i>	<i>Bar.</i>	<i>Symp.</i>	<i>Ther.</i>	<i>Remarks.</i>
15th May.	CHILLAKHAL, RUNGPORE,	25° 52'	89° 37'	A. M. Easterly wind in hard gusts. Noon N. E. and heavy squalls. 2 p. m. North terrific gusts; 2½, N. b. E.; 5 p. m. moder- ating.	29.51 to 29.16 and 29.45	..	..	Sunset 14th, heavy bank of clouds to the S. West. Storm ceased about mid- night of 15th.
	GOWALPURA, AS- SAM,	26.11½	90.37	11 A. M. N. East, increasing to hurricane at 2 p. m.; 4 p. m. moderating but renew- ed at N. N. E.	..	..	..	1 A. M. 16th, veered to South and S. W. blowing a hurricane with gusts, and moderating at 3 p. m.
	GOWHATTY, AS- SAM,	26.10½	93.46	A. M. N. E. Noon gale to midnight.	29.45 to 29.32	..	78° to 79	

PART II.—REMARKS.

I now proceed to detail the considerations from which the tracks of the Cyclones are laid down, and to add a few remarks on the phenomena of the principal one.

On the 12th May.—We have, first, the unfortunate ship *London* with a fresh N. East breeze, to which she could just carry her main top-gallant sail, running $8\frac{1}{2}$ knots to the S. W. or in the N. W. quadrant of her Cyclone, which before midnight was a tremendous hurricane obliging her to heave to at 10 hours 30 minutes P. M. when the wind was veering to the Northward and N. West, so that the ship in the 80 or 90 miles of run which she had made to this time had crossed in front of, and forced herself close in towards the centre; and at 2.30 A. M. of the 13th, lost her mizen mast by one of the terrific squalls from Northwest, which she would of course find there. If we allow the wind to have been North at 10 30 P. M. when the ship hove to, and that the centre then bore East from her at a distance of 25 miles; the most we can allow, seeing how rapidly the wind veered with her from this time; this will place it at this hour (10.30, P. M. 12th) in Lat. $15^{\circ} 7'$ N. Long. $89^{\circ} 20'$ East, and if it was the same Cyclone as that which afterwards passed up over the Sunderbunds, it was travelling up at the rate of eight miles an hour, since it passed the station of Bagundee (see p. 425) at 418 miles N. $\frac{1}{2}$ West distant from this position at 2.30 A. M. of the 15th, which gives an interval of 52 hours. None of the other ships were near enough at this time I should consider, to feel the effects of the Cyclone as to wind, though the sea and gloomy weather and their Barometers were all giving warning on the following day.

13th May.—We have on this day the *Precursor* Steamer though far to the Westward, and the *Eneas* on the same parallel, but three degrees farther to the Eastward with gloomy and threatening indications sufficient to induce them, very properly, to make due preparations, and farther to the Northward we have the *Limehouse* with a heavy head sea and the wind (not marked at Noon but before it, W. N. W. and P. M. West) about W. by N. the gale constantly increasing. The *Amazon* to the N. W. of her has at noon strong breezes from the N. W. with torrents of rain and finally so many indications of a Cyclone to the N. East of her, that she is very properly kept away to the S. S. E. to avoid the centre. The winds of both these ships were probably influenced by the vicinity of the shore and by the monsoon, to which, also the high Barometer of the *Limehouse* may be owing; and if we admit the *London's*

Cyclone, which was an undoubted one, to have been *the Cyclone* which travelled up to the Eastward of the Light vessels and over Bagundee, and this appears to me to be its probable track—we shall be unable to reconcile any centre upon this track, taking also the known rate of travelling which we have assigned above with these ships' positions and winds.

I have therefore assumed that there were on this day, and for part of the 14th, two Cyclones, the main one being the *London's*, which certainly was, during the whole of this day, a furious tempest with that ship, passing off at a moderate rate of progression to the Northward; and the smaller one being that indicated by the winds of the *Amazon* and *Limehouse* only; of which the centre seems to be in Lat. N. $17^{\circ} 49'$ Long. $86^{\circ} 38'$ and being of so small an extent that it did not reach the position of the *Adelaide* on this day at noon. And there is nothing new in this assumption for we know, that these in-shore Cyclones hereabouts, while larger and heavier and perfectly formed ones are blowing in the Bay, are quite common. It would seem indeed that as in a former instance (XXIII. Memoir, Journal, Vol. 23rd, p. 505) the minor of the two Cyclones, or in other words the absorption of the small one into the larger, occasioned some disturbance in the regularity of the wind at False Point Light House, for we find that there were not only two distinct scuds S. East and S. W., but that moreover the wind veered from East to North settling to a steady gale at N. W. till noon of Friday the 14th, when it changed to North, and at 5 veered again to S. East breaking up at 6 p. m. in a S. S. E. and finally a Westerly breeze.

For the main Cyclone on this day we have no other position than its calculated distance on the line of track at eight miles per hour which will place it in Lat. $17^{\circ} 25'$ N. Long. $89^{\circ} 15'$ East, and we shall see also that this line of track and rate of travelling agrees on the 14th, with the times and direction of the winds experienced by the Floating Light Vessel, and *Salween*, P. V. at the Sand Heads.

14th May.—If we take for this day on the line of the main or *London's* Cyclone, the same rate of travelling as before, viz. six miles per hour, for the twenty-four hours, we shall find that the centre falls on a spot in Lat. $20^{\circ} 38'$ N. Long. $89^{\circ} 03'$ East or forty-four miles to the S. East of the Floating Light Vessel's station, and that this position with the line of the track which we have assumed, agrees with the rapid veering of the wind after Noon of this day as shewn by the capital Log of the H. C. P. V. *Salween*. It also agrees with the wind at Calcutta, at Saugor, Balasore, False Point and the Pilot Vessels on the Ridge, but it does not appear to have reached so far as the position of the *Adelaide*.

on its S. Western quadrant which ship, up to noon this day, had evidently sheered round the Western and Southern quadrants of the in-shore and smaller Cyclone as will be seen by the rapid veering of the wind with her. And the proximity of it to the large one fully accounts for the oscillation of the *Adelaide's* Barometer so well and so carefully observed by Capt. Stephens. We have also to take into account here that the S. W. monsoon which was blowing strongly along the coast was adding its force to this quadrant of the Cyclone. The distance, and the bearing of the centre of the main Cyclone, would give the *Adelaide* at most a moderate gale at N. W. or one of no greater strength than the strong squalls and puffs experienced at Calcutta at the same distance North of the centre at this time, whereas we find her with a hard gale at W. S. W. reducing her to storm trysails and evidently a part of the in-shore Cyclone as marked.

On the 15th May. We find the centre of the main Cyclone reaching Bagundee at 2h. 15' A. M. on this day, and passing over the Station House with about two minutes' lull; so that we may say that the true centre was at Bagundee at about 2h. 20'. A. M. an interval of (14h. 20') fourteen hours twenty minutes, since Noon of the 14th; which at eight miles an hour would give about 115 miles. The distance measured on the Chart is about 120 miles, and this position and rate of travelling will also be found to agree, almost exactly, with the winds experienced by the Floating Light at the Gasper Station and by the Grappler Buoy Vessel at Saugor.

But in advancing inland to the N. b. East from Bagundee the Cyclone seems to have increased its rate of travelling, though in some degree to have moderated its fury; for, passing over the Katgorrah report which being only at thirty-eight miles distance and the exact time of the passage of the centre not being ascertainable from the brief notice which we have from that factory, we have fortunately from Mr. Payter at Jeypoor to the N. N. W. of Bogorah very clear and sufficiently exact data to enable us to say that the centre passed there about 3 P. M. of the 15th, which would give 12 hours and 40 minutes for the elapsed time, since its passage over Bagundee at 2h. 20' A. M., the measured distance between these two positions being 148 miles; which will give 11.7. or eleven miles and three quarters per hour as its inland rate of travelling, while as we have seen it was only eight miles when at sea. It is thus an instance, and I think a solitary one, of a Cyclone *augmenting* its rate of travelling when it reaches the land. Was this owing to the junction of the smaller in-shore Cyclone of the *Limehouse* and *Amazon*?

We have no data which will enable us to follow the centre accurately

farther to the Northward and Eastward, though there is no doubt that it was felt severely in the district of Rungpore, and Eastward into Assam, but I have not carried the track beyond Jeypoor Bogorah on the Chart. I have however measured back from that station over which the centre passed at 3 p. m. 35.2 thirty-five miles, being the distance, at 11.7 miles per hour, of the centre South of Jeypoor at Noon, for its position on that day, which it will be seen falls in Lat. $24^{\circ} 28' N.$ Long. $89^{\circ} 03' E$ ast, giving a N. N. W. wind at Rampore Bauleah and an E. N. E. one at Chilakhal which taking into account the vicinity of high lands and the known irregularities of shore-winds are near enough* for inland reports. The singular fact related in Mr. Cooper's JESSORE report of the fall of the trees in opposite directions on an East and West road, whereas the track of the Cyclone was nearly North and South, is a beautiful exemplification of the puzzling shifts of wind which so much embarrassed our forefathers.

PART III.—OF OTHER PHÆNOMENA.

Thunder and Lightning.—The question of the Thunder and Lightning experienced in any part, or at any time, of a Cyclone is always one of much interest. We find that the *Eneas*, *Limehouse*, *Amazon*, *Adelaide* and *Precursor* had all lightning more or less; the *Limehouse* indeed had it of an excessively vivid description, but whether this occurred when the disturbance occasioned by the junction of the two Cyclones took place, we cannot exactly affirm. In the Bagundee report, Mr. Crank, distinctly states that there was no thunder or lightning, nor is there any particularly noticed in any of the inland reports, except from Malda where the lightning was seen at a distance, and the absence of it is also specially stated from Rampore Bauleah.

EARTHQUAKES.

There is no room, I should think, to doubt that Mr. Crank has fully established for us that in this instance at least, and at the centre of the Cyclone, earthquake shocks were experienced; his peculiar situation in being with his family in a small brick built edifice intended for a pig-stye and his frequent experience of earthquakes in other parts of the world† give us the best assurance that he could not be mistaken, as persons residing in houses of one or

* There is some discrepancy in the Rampore Bauleah report, and the table at the foot of it which I cannot reconcile.

† This is more important than would be supposed: I have also lived some years in *earthquake countries* and can usually distinguish shocks much sooner than persons who have not that experience.

two stories where every thing is vibrating by the force of the wind might be, unless the shocks were very strong and sudden. Some reports also reached me that some of the pensioners and Commissariat Officers who reside at Cooly Bazar,* where the houses are all lower-roomed ones only, had also experienced shocks of earthquakes, and I sent a paper of queries for circulation amongst the occupiers of these houses, but only one person clearly and distinctly stated that he had experienced a shock of an earthquake between 12 and 1 A. M. of the 15th, in that locality.

BANKS OF CLOUDS.

It will be noticed that in the Balasore, Pooree (Cuttack), Dinajpore, and other reports the Banks of Clouds indicating the position of the passing or approaching Cyclone, were very distinctly seen, so that had these been ships at sea they would from this sign alone, have had ample and timely warning to take all necessary precautions.

ELECTRIC NOISES.

Mr. Crank's report of these singular and appalling sounds is, I think, conclusive when taken with what I have brought together in the Horn Book, p. 179, regarding the noises heard on the approach and at the passage of the centre of Cyclones,) as to their being electric phenomena? but the peculiar interest of Mr. Crank's report is that it corroborates on shore what we have such ample evidence of at sea. That my readers may not suppose there is any exaggeration in this gentleman's account I copy here from Luke Howard's Climate of London, Vol II. p. 151, in a description of the October Cyclone of 1811, as experienced off Halifax by H. M. S. Tartarus and three other men-of-war, the following passage, "I would if possible give you a description of the noise occasioned by the hurricane but I am unequal to the task: if you can conceive however all the savage animals of the brute creation assembled to affright mankind by their roaring you will have some faint idea of the deafening variety of sounds in the tempest we have experienced!"

The report from Cuttack will also be found to afford some remarkable electric evidences.

* A suburb of Calcutta about one mile to the south of the forts on the banks of the river.

Literary Intelligence.

The Rev. Mr. Long's Catalogue of Bengali Books furnishes much useful information which has not hitherto been accessible. It is but an abstract, however, of a larger one now in the press, and which will be of greater interest. The Catalogue confines itself to printed books, which however may be supposed to comprehend all Bengali compositions of any interest. Apparently the oldest work in MS. yet discovered is the Tipperra Raj Mala, an analysis of which was given by the industrious author of this Catalogue in vol. 19 of our Journal, but the authenticity of this work was not beyond doubt, and unfortunately the Rajah, notwithstanding the kind exertions of Mr. Metcalfe on our behalf, would not allow us the satisfaction of examining the original MS.

Dr. Sprenger has, on the recommendation of the Supreme Government, obtained the permission of the Hon'ble Court of Directors to complete his Catalogue on the extended plan adopted in his 1st vol. It is stipulated, however, that the work is not to exceed 5 vols.

Dr. Röer has kindly placed at our disposal some letters from Berlin, from which the following translations are extracts.

"Dr. Steinthal has published an excellent work "Grammatik, Logik und Psychologie, ihre Prinzipien und ihr Verhältniss einander." It is said, that he is to go as French consul or interpreter of the consul to China; for the last two or three years he has studied Chinese in Paris. A. Regnier, a disciple of Burnouf, has published a very able and exhaustive paper on the Vedaic language, in connexion with another "on the formation of Greek nouns." We may expect a new edition of Bopp's "Vergleichende Grammatik" and an English translation of it by Austin (?) (Hertford), which is to appear at the same time. The third volume of Lassen's "Indische Alterthums Kunde" is about to be printed at Elberfeld. Dr. Pertsch is preparing an edition of the Taittiriya Aranyaka for which he has collected materials in England. I suppose, Baboo Rajendra does not intend to include this in his edition of the Taittiriya Bráhma. It would be a great pity, if two editions of the same work should be published."

Bahoo Rajendra always intended to include the *Aranyaka* in his edition of the Bráhmaṇa, which would indeed be incomplete without it. Our Society's project for publishing the Black Yajur has been no secret for the last three years, and this announcement cannot require from us any modification of it. The translation of Bopp referred to in the letter must be Eastwick's, part of which has already appeared.

From a letter from Dr. Weber, dated 11th May.

"Roth's and Whitney's edition of the Atharva Veda has appeared. It is very elegantly printed. Benfey has published a new Sanskrit grammar, more compendious than his former one. Four numbers of the 4th volume of Vrahm's Journal "Fur vergleichende Sprachforschunz," are out; Stenzler prepares an edition of Páraskuras Grihyasútras. The edition of the Zendavesta by Westergaard embraces all the texts. Spiegel is printing a Huzváresh (Pehlvi) grammar (in Vienna). He has finished his translation of the Zend texts in MS. but not in print; the same is the case with his edition of the text. A Demotic grammar by Dr. Brugsch has been published by Messrs. Dúmmler; the types are all new, and it is a master-piece of typography."

We extract the following from a letter from Professor Wright of Oxford to Lieut. Lees.

"I presume you are acquainted with all the recent publications in our particular department. In case however it should be otherwise, I will call your attention to Kosezarten's edition of the Dewan of the Hudhailite Arabs دیوان الہذلین, to N. v. Tornamo's "Moslemische Recht," and to Amari's "Storia dei Musulmani di Sicilia." This last promises to be a very valuable work, a side piece to Dozy's *Recherches sur l'histoire de l'Espagne*. The publications of the Parisian Asiatic Society are progressing well; the 3rd vol. of *Ibn Baṭūṭah* is in the press, and I believe the first of *Al-Mas'ūdī*.* The 2nd vol. of Juynboll's *Abú 'l-Mahásin* is likewise out. It may in-

* Lieut. Lees informs us on the strength of late advices from Paris (M. Mohl, dated 16th August) that the printing of the "Meadows of Gold"—which had been interrupted by the temporary employment in the Imperial Library of the Editor was rapidly progressing, one-half of the 1st Vol. had been printed.

terest Sprenger to know that a pupil of Fleischer's, by name Ralfs, is preparing an edition of the Burdah ^{بُرْدَة} قصيدة البردة

"If you are acquainted with any MS. of the *Kámil* of *al-Mubar-rad* ^{الْمُبَارَّد} الْكَامِلُ لِلْمُبَارَّدِ in India, will you kindly inform me of it. I am preparing an edition of this large grammatical work, which contains also much old poetry and many valuable historical data. At Leyden I copied one fine MS.; this I have collated with one lent me by Dr. Sprenger (very bad), and one at Cambridge (tolerable). There is still a 2nd at Cambridge for me to go through.

"I may mention finally that there is a chance of an edition of the well known poems ^{الْمُعْصَلَيَّاتُ}. In the last collection purchased by the Berlin Library there is a fine MS. of these poems, and Dr. Josche, one of the Curators has obtained from me the loan of my copy of the MS. in the British Museum for the purpose of collating it."

From Mooltan a letter from Lieut. Raverty contains the following announcement.

"There is a celebrated shrine here of Bhanal Hak whom Shaik Sadi visited at Mooltan. I am getting all the accounts I can concerning it. They say here that the original copy of the Gulistán written in Kufic and in red ink was given to Bhanal Hak by the author, and that it is still in the possession of some parties in the Mooltan District!! I am trying to find out."

The writer is just bringing through the Press the last sheets of an excellent Pushto Grammar after publishing which he will give his attention to the Brahooi language.

The N. W. Series to which we alluded in a former number is to consist of selected Mohammedan histories. From a lithographed invitation circulated with a view to purchasing or borrowing MSS., we find that the selection is as follows :

Ferishtah.

Kholasut ool Towarikh.

Chuch Nameh.

Tarikhi Sind.

Turjumah tarikhi Yemini.

Tabkati Nasiree.

- Ferozshahee—Zeea Burnee.
 Ditto—Shums Sooraj.
 Intikhah Zufur Nameh.
 Mukhzun i Afghanee.
 Muntukhub ool Lubab.
 Tarikhi Chagatai.
 Wakiyat i Baberi.
 Ditto Humayoon.
 Akbur Nameh.
 Intikhah i Tarikhi Budaonee.
 Zoobdat ool Towarikh.
 Masir i Ruheemee.
 Masir i Alimgiree.
 Jahangeer Nameh.
 Badshah Nameh.
 Hadikat ool Safa.
 Abrut Nameh.
 Tarikh i Iradut Khan.
 Tarikh i Nadir ool Zamanee.
 Siyar ool Mootakhereen.
 Tarikh i Moozufferi.
 Muntukhub ool Towarikh.
 Hadikat ool Akalim.
 Oosaf.
 Tozuk i Timoorie.

It is not intended to publish all these works. These are to be collected for deposit in the Government Colleges and the more important of them and selections from some of them, such as the Muntukhub ool Towarikh, Tarikh i Moozufferi and other general Histories will appear in the Series. Parties lending MSS. for collation will be presented with a copy of the work when printed.

It is indeed high time for the credit of British rule in India to collect these historical materials, when we find native gentlemen admitting to Mr. Hammond, who is to superintend the publication of the Series, that "numberless valuable libraries have been sold as waste paper to druggists and makers of fireworks!" This project, which has been already commenced, a copy of Zeea Burnee's Feroz-

shahee having been prepared for press, is a part of the greater one to carry out which poor Elliott overtaxed himself, and which will yet it is to be hoped be matured and completed under competent management at home.

The plan which Lieut. Lees, assisted by the Moulvees of the Madrasah had formed for publishing al-Zamakhshari's commentary on the Quran has been so far modified as to include the publication of the text of the latter, which will be given with the *ramooz awqaf* or stops between the verses. Underneath this will be printed the above commentary entitled the Kashshaf, to furnish which six or seven copies of the work, some of them of very old date, have been collected from various parts of India. The 1st vol. will, it is hoped, appear in a few months.

Lieut. Lees is also engaged on an edition in 2 vols. Svo. of the Tarikh-al-Khalfa by the celebrated Soyootee, being the history of the Arabian Khalifs from the commencement of the reign of Aboo Bakr, while he has nearly ready for publication a Persian work, the Araish i Bozorgan, which is an obituary with short biographical notices of some 250 Mohammedan saints. This is a compilation from numerous authors whose works are not procurable in India or Europe. Moulvee Kabir oodeen Ahmed has given his assistance in editing this last work and Moulvee Abdool Hak is engaged on the Tarik-al-Khalfa.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JULY, 1855.

The usual monthly general meeting of the Society was held on the 4th instant at half-past 8 P. M.

SIR JAMES COLVILE, Kt. President in the chair.

The proceedings of the last month were read and confirmed and the accounts and vouchers for the months of February, March, April and May laid on the table.

Presentations were received—

1. From the Private-Secretary to the Hon'ble the Lt. Governor of the North Western Provinces, Meteorological Observations made in November last at Dadoopore, Boolundshahar, Mussooree, Roorkee, Hansi, Allighurh, Meerut and Umballa, in reply to the request made for such information on behalf of M. Leverier of the Paris Observatory.

2. From the Imperial Society of Agriculture, &c. of Lyon, its Annals for the year 1852-53.

3. From the Linnean Society of Lyon, its Annals for the year 1852-53.

4. From the Imperial Academy of Sciences of Lyon, its Memoirs for the year 1852.

Pursuant to notice given at the last meeting, Mr. Houstoun asked whether he might be allowed to see and have access to all papers the property of the Society.

The chairman referred Mr. Houstoun to Bye-law 101, and stated that under that rule the Journal books of the Society and of the Council, were open to the inspection of any ordinary member during office hours. After some discussion, Mr. Houstoun moved that, "he may be allowed to see and have access to all papers the property of the Society." As an amendment to which Dr. Walker moved that the

question, being one of importance, should be referred to the Council for report under Bye-law 45.

The amendment was carried.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members.

W. S. Atkinson, Esq. Principal of La Martiniere.

T. Loch, Esq. C. S.

Lt. R. Stewart, 22nd N. I. Kachar, was named for ballot at the next meeting, proposed by Lt. Bivar and seconded by the Secretary.

A letter from Lt. Bruce, H. M. 29th Regt. communicated his wish to withdraw from the Society.

In accordance with the notice given at the last meeting the President announced that, under the 60th Bye-law, the Council have elected Dr. Spilsbury as a Vice-President, and Capt. James and Mr. Bayley as members of their body, in the room of Col. Baker and Capt. Thuillier resigned.

The President moved that these elections be confirmed.

The question was put and carried.

Communications were received—

1. From Mr. Under-Secretary Morris, announcing that His Honor the Lt. Governor has been pleased to accede to the Society's request for a grant of Rs. 1,200, for paving the basement story of the Museum with Chunar flag-stones.

The President proposed that the best thanks of the Society be conveyed to His Honor the Lt. Governor for this mark of his consideration. The question was put and carried.

2. From Bábu Rádhánáth Shikdar enclosing abstracts of the hourly Meteorological Registers kept at the Surveyor General's Office, Calcutta, for the months of March and April last.

3. From Lt. G. H. Raverty, forwarding an account of a visit to the shrine and town of Sakhi Sarwar in the lower Dirajat, with a notice of the Annual Melá or Fair held there.

4. From Bábu Rájendralál Mittra, submitting a note on two inscriptions from the Island of Putu in the Chusan Archipelago.

5. From Rev. J. Hislop, communicating a paper on the age of the coal strata in Western Bengal and Central India.

The Librarian and the Curator in the Zoological Department having submitted their usual monthly reports, the meeting adjourned.

Report of Curator, Zoological Department, for July, 1855.

1. The first contribution which I have now the pleasure of bringing to notice is that of two fine (and nearly perfect) skeletons of the *Mias Rambi* Orang-utan (*PITHECUS BROOKERI*, nobis, *J. A. S.* XX, 375); presented to the Society by Sir James Brooke, K. C. B., Governor of Sarawak.

The skeletons are those of a fully adult but not aged female, with the epiphyses of the limb-bones well ankylosed, yet with sagittal crest undeveloped,—and of a nearly full-grown male, with incipient sagittal crest, but with the epiphyses of the limb-bones more or less detached and exhibiting other proofs of incomplete growth. In both specimens, the third or last permanent grinders had been brought into wear; the amount of attrition being considerable in the female, and much less so in the male.

As from the structure of the pelvis and certain other characters, no doubt whatever can exist respecting the sexes of these two individuals, we accordingly obtain the requisite data for deciding upon the sex of the skeleton of an adult *Mias Pappan* which was presented on a former occasion to the Society; and can now pronounce, with confidence, that the latter was a male animal, and moreover it appears from accumulating evidence that the *Mias Pappan* is a smaller animal than the *Mias Rambi*, the adult female of the former corresponding in size with the adult male of the latter; the male of the *Rambi* (to judge from its skull) being much larger.

Individuals, however, of each may vary in size; as the skull of the female *Rambi* now sent is considerably larger than that of the much older female *Rambi*, with high sagittal crest, figured in plates 3 and 4 attached to the memoir upon this genus in *J. A. S.* Vol. XXII. A distinguishing sexual feature would appear to exist in the conspicuously greater breadth of the orbital ring exteriorly (especially its malar portion) in the male, and also the greater breadth of muzzle in the adolescent male, and the general appearance of massiveness, indicative of its future growth, as compared with the skull of an adult female. In our huge old Sumatran male, the extent of grinding surface of the series of upper molars (including bicuspids) is $2\frac{1}{4}$ in.; in the young Bornean male now sent, $2\frac{5}{16}$ in.: the anterior bicuspid of the latter being somewhat pushed forward outside of the hind margin of the canine, and the interspace between the canine and outer incisor being but half as great as in the fully developed animal. In both females, the same grinding surface is but $2\frac{1}{3}$ in.; and in the adult male *Pappan*, intermediate, or $2\frac{1}{4}$ in. This male *Pappan* (as

now determined), to judge both from the degree of attrition of its molars, and that of *ankylosis*, was a somewhat (but not much) younger animal than the female *Rambi*, and considerably more mature than the adolescent male *Rambi*: both of the former, however, had certainly attained their complete growth, and we observe a marked difference in the proportions of the limbs, which alone would go far to remove any doubt of the distinctness of the two species.

The extreme length of humerus of the adult male *Pappan* is $14\frac{1}{4}$ in., and of ulna $14\frac{1}{2}$ in.; in the adult female *Rambi*, respectively $14\frac{1}{2}$ and 15 in.: femur of male *Pappan* $10\frac{5}{8}$ in.; of female *Rambi* $11\frac{1}{2}$ in.: tibia of former, $9\frac{1}{8}$ in.; of latter, $9\frac{5}{8}$.

The total length of pelvis in the female *Rambi* is 11 in.; extreme breadth apart of the ilia $11\frac{1}{8}$ in.; of pelvic aperture (measured behind) $3\frac{1}{8}$ in.: the corresponding measurements in the male *Pappan* being respectively $9\frac{5}{8}$ in., $10\frac{3}{8}$ in., and $2\frac{7}{8}$ in.

A more detailed comparison must be deferred until we can get the female *Rambi* skeleton mounted. At present, we may remark that our great Sumatran male *Rambi* skull (Vol. XXII, plates 1 and 2,) about corresponds with Prof. Owen's great Bornean *Rambi* skull, figured in *Tr. Zool. Soc.* Vol. 2, pl. 31; only that the supra-orbital ridges are less flattened back, and the profile consequently is more concave: while the Bornean female *Rambi* now received would correspond with Prof. Owen's Sumatran (?) female, figured in *Tr. Zool. Soc.* Vol. 1, pl. 53, were it only much older, and had it its sagittal crest developed; its lambdoidal crests are remarkably developed. In the adolescent male *Rambi* skull, it is remarkable that the nasal bones continue distinct (which is unusual in this genus, even in the half-grown animal); the two being but very imperfectly united, and the same is observable in our adolescent female small Orang skeleton with comparatively short fore-arms. In our adolescent male *Rambi*, the nasal bones do not ascend upon the *glabella* as in our other *Rambi* skulls.

2. T. C. Jerdon, Esq., Ságur. Specimen of a new Indian species of Swallow, belonging to the group of 'Republican Swallows' (PETROCHELIDON of the Prince of Canino), and having similar habits to the well known *HIRUNDO FULVA* of N. America. The specimen is not a good one to describe from, being not fully mature; but its upper-parts should be glossy black, with white lateral edges to the dorsal feathers more or less seen: the rump brownish; and crown dark rufous: lower-parts white, with black mesial streaks to the feathers of the throat and breast; the under surface of wings pale brown: tail slightly furcate, with a slight whitish spot more or

less developed towards the tip of the inner web of most of its feathers: tertaries also whitish-tipped. Length about $4\frac{1}{2}$ in., of which tail $1\frac{3}{4}$ in.; wing $3\frac{1}{2}$ in.—*HIRUNDO FLUVICOLA*, nobis, n. s. “This interesting new retort-nest building Swallow,” writes Mr. Jerdon, “I discovered during a late trip, and found it only in two spots, building in company; the nests crowded together on rocks overlying the rivers (Sonar and Kane) in Bundelkund. It was then breeding (April and May), but I could not get at the nests.” A rough sketch of the latter is sent, representing “retort-nests” with short necks, and crowded together, similar to those of the American *H. FULVA*, Vieillot (v. *H. brunnifrons*, Say).

3. From Major A. P. Phayre, Commissioner of Pegu. A collection of skins procured in the course of a recent tour through that province.

Of mammalia, are sent the skin of a Jackal, that of a Hare, and those of three species of Squirrel.

The Jackal (*CANIS AUREUS*) was shot at Meaday by Lt. Bosworth of the Bengal Artillery, and (as remarked by Major Phayre)—“has set at rest the question of that animal being found in Burmah or not.”

The Hare is not *LEPUS SINENSIS* (as supposed from the much discoloured fragments of a skin, noticed *J. A. S.* XXI, 359); but is of a peculiar and hitherto undescribed race, which may be designated

LEPUS PEGUENSIS, nobis, n. s. Very similar to *L. RUFICAUDATUS*, Is. Geoffroy, of Bengal, and all Upper India, Asám, &c.; but at once distinguished by having the tail black above, as in the generality of the genus. The upper-parts are of the same colour as in the Bengal Hare, but contrast directly with the pure white of the belly, instead of passing to it through fulvous as in the other; and the limbs also shew but a slight fulvous tinge, with white hairs intermixed, especially on the hind-limbs where the white predominates: the chin and throat (in fact the fur over the whole lower jaw) are conspicuously white; and the short sparse hairs on the outside of the ears are whitish,—except in front, and also the tip posteriorly, whereon is a large blackish terminal patch. The fur of the upper-parts is pale dusky-grey at base, then black, and finally bright fulvous-brown with black extreme tips: towards the tail above is a strong tinge of ash-colour. Size, proportions, and structure, as in the common Hare of all Upper India.*

* Of the Hare from the vicinity of Dacca referred to by the name *L. TYTLERI* in the *Ann. Mag. N. H.* for September, 1854, p. 176, the Society possesses a specimen presented by Capt. Robt. Tytler, of the 38th N. I. (*J. A. S.* XXII, 415); but we can perceive in it no distinction from the common *L. RUFICAUDATUS*, stated also by Capt. Tytler to inhabit the same district.

The three species of Squirrel sent are the large *SCIURUS BICOLOR*,—*Sc. KERAUDRENI*,—and *Sc. PYGERYTHEUS*. The first abounds throughout the Burmese countries and the Malayan peninsula, and northward to the Asám hills and those of Sikim and Nepal: but its pale variety we have only seen from the Malayan peninsula. Himalayan specimens (*Sc. macrouroides*, Hodgson,) have longer fur on the ears, but present no further difference that we can perceive; and even this may be merely seasonal. *Sc. KERAUDRENI* is common in Arakan: and we recognise in *Sc. PYGERYTHRUS* a species formerly sent from Rangoon by Dr. Fayrer, being the supposed variety of *Sc. LOKROIDES* noticed in *J. A. S.* XXII, 414, and distinct from the presumed variety of *Sc. PYGERYTHRUS* formerly sent by Major Phayre from Moulmein, which is described *J. A. S.* XVII, 345, and may now stand as *Sc. PHAYREI*, nobis, *n. s.**

* The multiplicity of small Squirrels with mostly annulated or grizzled fur, inhabiting the Burmese and neighbouring countries, are most difficult to discriminate. Of the group of gigantic Squirrels, there is only *Sc. bicolor* (and its pale variety in the Malayan peninsula); and of that of small striped Squirrels, only *Sc. BERDMOREI*, nobis (*J. A. S.* XVIII, 603), and *Sc. BARBEI*, nobis (*J. A. S.* XVI, 875), that we know of as yet,—though *Sc. INSIGNIS*, Horsfield, is likely to inhabit the more elevated interior of the Malayan peninsula: but the other small and medium-sized Squirrels seem almost interminable; and we have the following series in our museum, which may be briefly indicated with advantage, for the benefit of students.

1. *Sc. RAFFLESII*, Vigors and Horsfield: *Sc. Prevostii*, Desmarest. Larger than *Sc. hippocurus*. Black above, deep rufo-ferruginous below and on the feet; a very broad white lateral band from mouth to haunch, extending over the outside of the thigh, and more or less greyish from cheek to shoulder (inclusive): tail of a somewhat duller black than the back, and a little rufescent at tip. Inhabits the Malayan peninsula.

Remark. A nearly affined race inhabits Borneo, which is the *Sc. REDIMITUS*, Van der Boon, and when half-grown—*Sc. rufogularis*, Gray, erroneously (in all probability) supposed from China. This race has blackish cheeks and rufous shoulders; a grizzled band, formed of whitish-tipped hairs, above the white lateral band, and this grizzling is continued over the haunch and hind-limb: the tail also is much grizzled with white, in a specimen presented by the Batavian Society to our museum. Of very numerous examples of *Sc. RAFFLESII* (from the Malayan peninsula) examined, we have observed no remarkable variation, nor tendency to assume the distinctive colouring of *Sc. REDIMITUS*: but *Sc. RUFONIGER*, Gray, is probably a mere individual variety of the former, especially as Malacca is given as its habitat. It is thus briefly described:—"Black; throat, inner side of legs, and beneath, bright red; an indistinct streak along each side, and the outer side of the thigh, white, grizzled." *Anni. Mag. N. H.* X, 263 (1842).

Among the birds, we observe, with surprise, an unmistakeable specimen of the common British Meadow Pipit (*ANTHUS PRATENSIS*) in its summer plumage. We have never seen this bird from any part of India, though Mr. Gould states it to occur in the west (*P. Z. S.* 1835, p. 90).

By Dr. S. Müller and also by Dr. Cantor, the Malacca and Bornean races are considered as mere local varieties of one species: but the application of this principle of classification to many of the following races could only be most arbitrary).

2. *Sc. HIPPURUS*, Is. Geoffroy: *Sc. rufogaster*, Gray; *Sc. castaneoventris* (?), Gray, the young? Much larger than the common British Squirrel. Lower-parts and inside of limbs deep rufo-ferruginous; head, shoulders, and sides of limbs, dark grizzled ashy; rest of upper-parts, with base of tail, deeply tinged with rufous, and also grizzled,—contrasting much with the dark leaden-grey of the cheeks and limbs externally: rest of tail dullish black; and feet nigrescent. Common in the Malayan peninsula, Sumatra and Java. We have seen very numerous specimens from the first named region, but *no variation* whatsoever.

3. *Sc. ERYTHROGASTER*, nobis, *J. A. S.* XII, 972: *Sc. hippurus* of Asám, *auctorūm*. Upper-parts uniformly of nearly the same dark grizzled ashy as the head and outside of limbs of the preceding race; this grizzling extending about half-way along the tail, the remainder of which is dull black: feet nigrescent; and lower-parts deep rufo-ferruginous. Inhabits the Munnipur hills, and those E. and S. of Upper Asám.

4. *Sc. ERYTHRÆUS*, Pall. s.: *Sc. hippurus*, var., McClelland and Horsfield. Colours nearly as in *Sc. HIPPURUS*, but duller and more blended; the rufo-ferruginous hue of the belly contrasting abruptly at the sides of the body (whereas in *Sc. HIPPURUS* the sides are so rufous that the contrast is much less decided): ears bright rufous; and the terminal two-thirds or more of the tail are nearly of the same colour as the belly, the tip generally being paler. There is also more or less rufous about the muzzle. Inhabits the Khásya hills, and neighbouring mountains of Lower Asám.

(*N. B.* *Sc. ERYTHRÆUS* is described to have slightly ciliated ears (*auriculae sub-barbatæ*), and a blackish stripe running down the tail. The ears of our animal can scarcely be termed ciliated; but two very young specimens from Asám have the basal third of the tail black posteriorly (except at the extreme base), passing more or less upward as a medial line; and it is probable that some adults exhibit the line as described.

It would seem further that the rufous of the muzzle extends sometimes more or less over the crown; and that the tail-end is occasionally blackish, though we have never seen it so (*var. b.* from Butan, of Gray's British Museum Catalogue).

If Nos. 2, 3, and 4, are to be regarded as merely local varieties of the same species, No. 5 should also be so classed: but the difficulty begins with No. 6; and if that be admitted, why not also Nos. 7, 8, and even 9? Wherever drawn, the

ORIOLUS TENNIROSTREIS, nobis, *J. A. S.* XV, 48. A fine adult specimen. We formerly described this species from the skin of a young bird, not in good plumage, which we found among a lot of skins put away as duplicates; and there can be little doubt now that the specimen referred to

line will be quite arbitrary; and, by the same rule, Sc. PALMARUM and Sc. TRI-STRIATUS of India should be placed as varieties of one species, although their voice is singularly different, and the latter race keeps everywhere to the jungle, instead of coming much into gardens and about houses like the other).

5. Sc. KERAUDRENII, Is. Geoffroy. Entirely of a deep rufous-ferruginous colour, with blackish paws, and whitish tail-tip: the tail, indeed, only differing from that of No. 4 is not being grizzled at base. Common in the hilly parts of Arakan and Pegu.

6. Sc. HYPERYTHRUS, nobis, n. s.: *Sc. erythræus*, var. A (?), Gray's *Br. Mus. Catal.* A little smaller than the four preceding races: the upper-parts uniformly grizzled throughout, black and golden-fulvous, but a strong ferruginous tinge on the head, and the ears bright rufous: lower-parts deep rufous-ferruginous, fading on the throat: tail coloured like the back, but its terminal half more brightly tinged with ferruginous and distinctly annulated: paws nigrescent. Length 8 or 9 in.; of tail with hair somewhat less; and foot $1\frac{1}{2}$ in. From Tenasserim (Moulmein ?). Presented by Capt. Berdmore.

7. Sc. GRISEOPECTUS, nobis, *J. A. S.* XVI, 873. Size of last. The general colour paler, uniformly grizzled throughout on the upper-parts and tail, which has a slight black tip: throat and breast also grizzled, and faintly washed with ferruginous; the belly and inside of limbs much deeper ferruginous: paws not darker than the rest, and no rufous about the face; but a pale ferruginous tinge on the tail. Habitat unknown. Described from a caged animal, in fine condition, which was transferred to the museum at its death.

8. Sc. CONCOLOR, nobis, n. s. (referred doubtfully to Sc. MODESTUS, S. Müller, in *J. A. S.* XX, 166). Size of the two preceding, and much like the non-rufous specimens of Sc. CHRYSONOTUS; or like Sc. NIGROVITTATUS, but larger and without the lateral stripes and rufous tinge about the head. Lower-parts dull ash-colour: the rest grizzled throughout with black and dull ruddy-ferruginous; the latter somewhat brighter on the middle of the back, croup, and upon the tail, which last is conspicuously ringed with black and dull ferruginous, and has a black tip mingled with hoary-white. From the vicinity of Malacca.

9. Sc. CHRYSONOTUS, nobis, *J. A. S.* XVI, 873. Size of the three preceding; and colour variable, but with always a conspicuous black tail-tip. Fur grizzled ash-grey on the limbs and under-parts, and more or less tinged with bright ferruginous on the upper-parts, especially on the nape and fore-part of the back; but in some specimens there is scarcely an obscure wash of this ferruginous, while in others the whole nape, shoulders, and anterior two-thirds of back, are intense

was from Arakan. Its distinctness as a species was obvious; and we now describe a fine adult from Pegu. From the other black-naped Orioles, it is at once distinguished by its much more slender and more distinctly curved bill, of a reddish colour; and by its narrower black nape-band,

bright ferruginous, shading off more or less to grey on the back and haunches: tail grizzled, sometimes a little tinged with ferruginous, and more distinctly annulated towards its black tip. Common in the Tenasserim valley.

(Qu. Does this animal vary in colour according to season, or become more deeply tinged with ferruginous as it advances in age? Our specimen least so tinged is from Mergui; and exhibits merely a faint wash of ferruginous, and this chiefly on the sides of the neck and body.)

The next three species are very closely affined, and not always easy to discriminate. They are much smaller than the preceding.

10. Sc. PYGERYTHRUS, Is. Geoff. Grizzled above as in non-rufous specimens of Sc. CHRYSONOTUS; below weak ferruginous, more or less deep, in some tolerably bright, in others faint and passing to whitish on the throat and sides of face: tail coloured like the back, and more or less distinctly annulated above, with a black extreme tip; below, the rufous of the lower-parts extends more or less up its base, but seldom conspicuously. Length about 7 in.; and tail with hair somewhat more: hind-foot $1\frac{1}{4}$ in.; fringed internally and all the toes tufted with rufous hairs. From the valley of the Irawadi (Rangoon, Pegu, &c.).

11. Sc. ASSAMENSIS, McClelland, Gray: Sc. Blythii, Tytler (*Ann. Mag. N. H.*, Sept. 1854, p. 72). Differs from the last in being more fulvescent above, and much less so underneath: tail-tip generally blackish; and commonly a greater development of pale ferruginous underneath the tail than in Sc. PYGERYTHRUS: above, the tail is very indistinctly annulated, if at all so: hue of the upper-parts more or less fulvescent; of the lower dingy whitish, with commonly a slight fulvescent tinge. A very abundant species, inhabiting the valley of Asám, and found about Dacca; also in Tippera, Chittagong, and Arakan.

12. Sc. LOKROIDES, Hodgson: Sc. lokriah apud Gray, *Brit. Mus. Catal.* Upper-parts darker than in the preceding, with never a black tail-tip; and the thighs externally often deeply tinged with rufo-ferruginous, though not a trace of this exists in many specimens. From Nepal and Sikim (*tarai?*).

13. Sc. LOKRIAH, Hodgson (nec apud Gray, *Brit. Mus. Catal.*): Sc. subflaviventris, McClelland. Size about that of the three preceding races, or a trifle larger; and the general hue darker and more ruddy above than in Sc. LOKROIDES, grizzled as usual, and with the under-parts moderately deep ferruginous, sometimes rather weak: tail coloured nearly as the back, but with whitish tips above, more or less developed; beneath, tinged with ferruginous, and exhibiting distinctly a double border on each side, from every hair having a white tip and black subterminal portion. A mountain species, inhabiting Nepal, Sikkim, Asám

and consequent greater extent of yellow upon the crown: upper-parts bright yellowish-green (rather than greenish-yellow), becoming more yellowish on the rump and upper tail-coverts: crown, neck (below the black occipital band), and entire under-parts, intense pure yellow: inner webs

with the Khásya hills, and those of Arakan: but the few specimens we have seen from the Arakan mountains seem to be smaller, and of a weaker ferruginous on the under-parts; perhaps a distinct race, but we have not the requisite data to form an opinion on the subject.

14. *Sc. TENUIS*, Horsfield. A Malayan species affined to the last, but considerably smaller, with the under-parts having but a very faint wash of ferruginous, while a stronger tinge of this hue appears on the shoulders and outside of the limbs; tail coloured as in *Sc. LOKRIAH*, but the black and white margins (as seen from behind) are hardly so conspicuous. We suspect that it is confined to a certain elevation in the Malayan peninsula and neighbouring great islands.

15. *Sc. MODESTUS*, S. Müller: *Sc. affinis*, Raffles, apud Horsfield, *Zool. Res. in Java*; nec *Sc. affinis* (*verus*), as described by Sir Stamford Raffles, *Lin. Tr.* XIII, 259, which description refers distinctly to the pale variety of *Sc. BICOLOR*: assigned dubiously by Dr. Cantor as a synonyme of *Sc. TENUIS*. Apparently very like the last, but larger, with the rufous more developed on the outside of the limbs and along the flanks. "Length 9 in., and tail 7 in." (Horsfield). Inhabits the Malayan peninsula, and has been met with on the island of Pulo Penang. We have seen no specimen.

16. *Sc. PHAYREI*, nobis, n. s.: *Sc. pygerythrus*, var., apud nos, *J. A. S.* XVII, 345. A beautiful species, of the size of *Sc. VITTATUS*, and nearly of the same colouring above, but the fur longer, and the tail much more bushy, with a well-defined black tip. Lower-parts bright ferruginous, inclining to maronne on the belly, and continued broadly along the under or hind surface of the tail to its black tip: inside of limbs ferruginous, continued nearly round the hind-limbs, and upon all the feet; the fore-limbs tinged with dusky externally, above the pale rufous foot; and a broad imperfectly defined blackish band upon the flanks, separating the colours of the back and belly. Length 9 or 10 in.; and tail with hair about the same: hind-foot 1½ in. From some part of the Tenasserim provinces. Presented by Major Phayre.

17. *Sc. VITTATUS*, Raffles: *Sc. bivittatus*, Desmarest. This very common Malayan species does not appear to extend northward into the Tenasserim provinces. It is readily distinguished by its two lateral bands, the upper white and lower black, with deep rufous under-parts and tail-tip.

18. *S. NIGROVITTATUS*, Horsfield: *Sc. griseoventer*, Is. Geoffroy. Differs from the last by having the belly ash-grey, no rufous at tip of tail, but a ferruginous tinge on the sides of the head and neck: its upper lateral band is also fulvous, rather than white. Inhabits the Malayan peninsula, where much less common than *Sc. VITTATUS*.

of the tertaries dusky-black: the outer coloured like the back, with a slight yellowish spot at tip, and the secondaries narrowly bordered with yellowish: terminal half or more of the greater coverts of the primaries bright yellow; and a few of the outermost coverts of the secondaries tipped with the same: middle tail-feathers black, the rest successively more broadly tipped with yellow; and the tail conspicuously more even or squared than in the commoner *O. INDICUS* of the same countries.*

19. *Sc. ATRODORSALIS*, Gray. Size of the preceding, with generally a much more bushy tail: upper-parts grizzled black and fulvous, with a great black patch upon the back; head rufescent, with white whiskers: lower-parts varying in hue from weak ferruginous to deep maronne-red: a tinge of the same upon the haunches; and hairs of the tail black with broad fulvous tips. In one specimen before us, with deep rufous ears and dark maronne-red under-parts, the tail is throughout grizzled like the back, and much less bushy than usual: perhaps a distinct race from those with ferruginous under-parts more or less deep, and an extremely bushy tail. Inhabits the Tenasserim provinces.

20. *Sc. CANICEPS*, Gray, is thus described. "Pale grey, grizzled: back yellowish: beneath, paler grey: tail long, grey, black-varied, ringed, the hair with three broad black bands." Size—? Inhabits Butan (*Ann. Mag. N. H.* X, 1842, p. 263).

21. *Sc. TUPAIOIDES*? A very curious species inhabiting the Malayan peninsula, which, by its lengthened snout and aspect generally, quite simulates the genus *TUPAIA*, Raffles, of the order *Insectivora*. It is doubtless the *RHINOSCIURUS TUPAIOIDES*, Gray (Appendix to *Brit. Mus. Catal.*, p. 195), from Singapore; but we doubt its being correctly referred to *Sc. LATICAUDATUS*, Diard (S. Müller, *tab. XV*, f. 1, 2, and 3), by Dr. Cantor (in *J. A. S.* XV, 251). The latter would rather appear to be a second species of the same peculiar type, of much paler and more rufous hue than the Malacca animal, and differing remarkably in the relative proportion of its molars, as noticed by Dr. Cantor (*loc. cit.*), and which inhabits the western coast of Borneo. In a Malacca specimen in our museum, there is even an indication of the pale shoulder-stripe of the *TUPAI*!

* We are acquainted now with five species of black-naped Orioles; viz.

1. *O. CHINENSIS*, L. (*vide J. A. S.* XV, 46). China (and the Philippines?)
2. *O. MACROURUS*, nobis (*vide loc. cit.*) Nicobar islands only, so far as known at present.

3. *O. INDICUS*, Brisson, Jerdon (*vide loc. cit.*) Common in the Burmese countries; rare in Lower Bengal: found also in S. India and in China.

4. *O. CORONATUS*, Swainson: *O. hippocrepis*, Wagler. Differs from *O. INDICUS* in having a narrower nape-mark, a shorter wing, and by the considerably reduced development of the yellow on the secondaries and tertaries. Hab. Java, and probably other islands of the great archipelago.

5. *O. TENUIROSTRIS*, nobis, *ut supra*. Burmese countries.

CHATARRHÆA GULARIS, nobis, *n. s.* A handsome species of this group, and the first which we have seen from the eastern side of the Bay of Bengal: though **CH. EARLEI**, nobis, extends into Tippera. It is affined to **CH. EARLEI**, but with a still longer tail, which is more distinctly rayed across. Colour ruddy-brown, passing to olivaceous on the hind-part of the back, each feather having a narrow black mesial streak: frontal feathers narrow, stiffish, pointed, and white with black mesial line; these peculiar feathers continued over but not beyond the eye: lores blackish: chin and throat pure white, extending down the front of the neck: ear-coverts and sides of neck unstreaked ruddy: breast and flanks ruddy-brown, paler on belly, and the lower tail-coverts duller brown: tail dull olive-brown, and conspicuously rayed across. Bill dull plumbeous, yellowish towards gape; and legs pale brown, darker on joints. Length about 11 in.; of tail 6 in.: closed wing 3 $\frac{3}{8}$ in.; bill to gape 1 in.; and tarse 1 $\frac{1}{8}$ in. *Pegu.**

ARACHNOTHERA AURATA, nobis, *n. s.* Like **A. MAGNA**, (Hodgson), but considerably smaller, with the mesial dark streaks to the feathers much less developed, excepting on the crown, and becoming almost obsolete on the rump: on the lower-parts, they are scarcely broader than the shafts of the feathers, whereas in **A. MAGNA** they are much broader: the edge of the wing is also of a much brighter yellow than in **A. MAGNA**. Length

* Having had occasion to re-examine the series of Indian **CRATEROPODINÆ**, it was found expedient to subdivide the genus **MALACOCERCUS**, Swainson, as follows:

1. **ACANTHOPTILA**, nobis. Type, *Timalia nipalensis*, Hodgson.
2. **CHATARRHÆA**, nobis. **CH. GULARIS**, *ut supra*, is about the most typical species. Others exist in **CH. CAUDATA** (*Timalia chatarrhaea*, Franklin),—**CH. HUTTONI**, nobis, *J. A. S.* XVI, 476, from Kandahar,—and **CH. EARLEI**, nobis.
3. **MALCOLMIA**, nobis. Type, **M. ALBIFRONS** (v. *Garrulus albifrons*, Gray, Hardw. *Ill. Ind. Zool.*, v. *Timalia Malcolmi*, Sykes). A second species would seem to exist in the *Malurus squamiceps*, Rüppell, of Egypt and Nubia; and a third probably in the *M. acaciae*, Rüppell, of Arabia Petræa.
4. **LAYARDIA**, nobis. Type, **L. SUBRUFA** (v. *Timalia subrufa*, Jerdon, v. *T. pæcilorhyncha*, Lafresnaye). A second species would seem to exist in the *Crateropus rubiginosus*, Rüppell, of Schoa.
5. **MALACOCERCUS**, Swainson; as confined to the species with rounded frontal plumes and less elongated and graduated tail, which are affined to the true **CRATEROPODES** of Africa (as exemplified by the *Ixos plebeius*, *leucocephalus*, and *leucopygius* of Rüppell; the *Crateropus Jardinii*, A. Smith, of S. Africa, illustrating another division of the same group). Of restricted **MALACOCERCUS**, about ten species (or distinguishable races) exist in all India and Ceylon, to which range of country they appear to be confined exclusively.

of wing 3 in. (instead of $3\frac{1}{2}$ in. or more), and the rest in proportion. From Pegu.

PYCNONOTUS HÆMORRHOUS, (Gm.) Specimen rather large, with closed wing $3\frac{3}{4}$ in.; but otherwise resembling examples from Arakan, S. India and Ceylon, Orissa, Agra, &c.; one from Wuzirabád being even larger, with wing $3\frac{7}{8}$ in.; the ordinary length being from $3\frac{3}{4}$ to $3\frac{5}{8}$ in. In **P. CAFER**, (L.), of Bengal, Nepal, Asám, Tippera, Deyra Doon, &c., the length of closed wing of the male is generally 4 in. The latter species has always a black nape; whereas the other has merely a black cap, the nape being coloured like the back, though generally with whiter margins to the feathers. In **P. CAFER**, also, the black of the lower-parts descends much further over the breast than in **P. HÆMORRHOUS**. **P. NIGROPILEUS**, nobis, of the Tenasserim provinces is a third nearly affined race, which differs from **P. HÆMORRHOUS** in having the black of the lower-parts confined to the chin, or even wanting altogether; and that of the cap well defined and contrasting sharply with the more or less whitish-edged feathers of the nape.

Genus **CORVUS**, L. Two species of Crow are sent, one being the common black Crow (**C. CULMINATUS**, Sykes,) of all India, and which we have received from Pinang and Malacca, where it occurs together with another black species, the **C. ENCA** (?), Horsfield (*v. macrorhynchos*, Wagler); and the other being the *melanoid* variety of our ordinary Indian Crow (**C. SPLENDENS**, Vieillot), which appears to be the common Crow of the Tenasserim provinces. In the Pegu specimen now received, and another from Mergui (all that we have seen as yet from that range of country), the *melanism* is more pronounced than in Cinghalese specimens, which exhibit a more decidedly ashy tinge on the nape and breast. In the Pegu specimen this is by no means conspicuously observable: yet Major Phayre remarks of it, that—"this is the common Crow of the branches of the Irawádi; but away from the river in the hills there is a Crow of the same size, but not with the same tinge on the neck, being of an uniform black throughout."

A fine specimen of our Indian **MACROPTERYX CORONATUS**, (Tickell), is the first example of this species which we have seen from the eastern side of the Bay of Bengal. In the Malayan peninsula, it is replaced by **M. KLECHO**, (Horsfield), and also (it would appear) by the very beautiful **M. CORONATUS**, (Tem.).

Of Pigeons, are sent **TRERON VIRIDIFRONS**, nobis: **TR. MALABARICA**, Jerdon;* **CARPOPHAGA CENEA**; and a pair of Turtle-doves, which are just

* A Ceylon species which we consider to be **TR. POMPADOURA**, auct., differs from **TR. MALABARICA** in being rather smaller, with bright yellowish-green forehead,

intermediate to *T. SURATENSIS* of India and *T. TIGRINUS* of the Malay countries, or which at least is the race inhabiting the Malayan peninsula. In the *Comptes Rendus*, tom. XI, 17 (January, 1855, No. 2), the Prince of Canino states that the Chinese *T. SINENSIS* extends its range to the Philippines and all Malasia; but we have never seen it from the Malayan peninsula, where a distinct race abounds, resembling *T. SURATENSIS* except in wanting the pale vinaceous spots on the scapularies and wings, while retaining the black mesial streaks which are wanting in *T. CHINENSIS*: there is also much less ash-colour on the wings than in *T. SURATENSIS*: but it is of the same size as the latter, or much smaller than *T. CHINENSIS* (which last has also deep ash-coloured lower tail-coverts). Of the two Peguan specimens now sent by Major Phayre, one differs little from the Malayan peninsula Dove, except that the spotting begins to appear upon the wings; while in the other the spots spread over the back, but are of a dull rusty colour and less defined than in the common Indian race. The Prince of Canino remarks, that *T. SURATENSIS* is particularly abundant in Ceylon: but it can scarcely be anywhere more so than in Lower Bengal.

FRANCOLINUS PHAYREI, nobis (*J. A. S.* XII, 1011), et *Fr. SINENSIS*, (*Tetrao sinensis*, Osbeck; *T. pintadeus*, Scopoli: *T. perlatus* et *T. madagascariensis*, Gmelin, nec Scopoli). We have compared the 'Pintado Partridge' of the Mauritius with a Chinese specimen, and can detect not the slightest difference; wherefore it may be inferred that the species was probably introduced into the Mauritius direct from China.* We now hesitate to consider *Fr. PHAYREI* as distinct from *Fr. SINENSIS*: the difference between them being even less than between *CACABIS GRÆCA* (*v. saxatilis*) and *C. CHUKAR*! As compared with *Fr. SINENSIS*, the Peguan bird would seem to have the long black supercilium broader, and extending more across the forehead, and the rufous supercilium above it narrower, and paler; also to have more developed spurs, and a somewhat

the throat yellower, and breast unsullied green (or having no ruddy patch): lower tail-coverts also white mixed with green, in both sexes; as in the female (not the male) of *Tr. MALABARICA*. Closed wing of male $5\frac{1}{2}$ in.; in the other $5\frac{3}{4}$ to 6 in.

* The Stag of the Mauritius seems, in like manner, to be the *C. RUSA apud S. Müller*, of Java, but with antlers certainty more flexuous in the beam. The Mauritian Hare is *LEPUS NIGRICOLLIS* of S. India and Ceylon, *v. L. melanuchen*, Tem., of Java, where also it has probably been introduced. The *GALLOPERDIX SPADICEUS* of S. India (a thorough Indian type) is common in the Mauritius, and (it is said) also in Madagascar, which latter surely requires confirmation! A common Malayan Monkey (*MACACUS CYNOMOLGOS*) is said to have gone wild on the island; and perhaps one or two of the small Passerine birds may have been introduced, as *ESTRELLA ASTRILD* from S. Africa, and certainly *ACRIDOTHERES TRISTIS* from India (the latter for the purpose of keeping down the locusts).

smaller bill. In Fr. PHAYREI the spurs seem generally to be $\frac{2}{3}$ in. length : and it remains to ascertain if they ever exceed $\frac{1}{2}$ in. in the species inhabiting China and the Mauritius. In plumage we can detect no further difference than has been mentioned ; and have never seen females of either.

The rest of Major Phayre's Peguan birds are as follow :—*PALÆORNIS TORQUATUS*, *P. SCHISTICEPS* (!), *P. CYANOCEPHALUS*, *BUCEROS ALBIROSTRIS*, *HALCYON GURIAL*, *ALCEDO BENGALENSIS*, *CORACIAS AFFINIS*, *EURYSTOMUS ORIENTALIS*, *MEGALAIMA LINEATA*, *CHRYSOCOLAPTES SULTANEUS*, *TIGA INTERMEDIA*, *PHœNICOPHAUS TEISTIS*, *HARPACTES ERYTHROCEPHALUS*, *DENDROCITTA RUFAS*, *GRACULA INTERMEDIA*, *GARRULAX BELANGERI*, *PARUS FLAVOCRISTATUS*, *PASSER FLAVEOLUS*, *EMBERIZA AUREOLA*, *PIPISTES AGILIS*, *PRINIA RUFESCENS*, *POMATORHINUS LEUCOGASTER*, *TEPHRODORNIS PONTICERIANA*, *PETROCOSYPHUS PANDOO*, *COPSYCHUS SAULARIS* (*nec MIN-DANENSIS*), *CERCOTRICHAS MACROURUS*, *CYORNIS RUBECULOIDES*, *ERYTHROSTerna LEUCURA*, *PRATINGOLA CAPRATA*, *PERICROCOTUS SPECIOSUS*, *CHAPTIA GENEA*, *EDOLIUS PARADISEUS* (var. *GRANDIS*, Gould), *DICRURUS LONGICAUDATUS*, *MYIAGRA AZUREA*, *PYCONOTUS MELANOCEPHALUS*, *IOLE VIRESSENS*, *PHYLLOURNIS COCHINCHINENSIS*, *IRENA PUILLA*, *ORIOLUS MELANOCEPHALUS*, *TURNIX OCELLATUS*, *HOPLOPTERUS VENTRALIS*, and *BUTORIDES JAVANICUS*.

Also, of *REPTILIA*, a small Box terrapin, which heretofore has only been satisfactorily known to inhabit Java. It is the *CISTUDO DENTATA*, (Gray), *C. Diardii* of Dumeril and Bibron, *Emys Hasseltii*, Boie, and *Cyclemys orbicularis*, Bell : remarkable among the *CISTUDINES* for its flattened form and notched hind-margin of sternum.*

E. BLYTH.

* Capt. Berdmore has since sent living specimen, from Schwe Gyen on the Sitang river, Pegu: colour of naked parts olive-grey, with longitudinal dull orange streaks on the neck, and a broader sincipital streak of the same. It is unusually quick in its movements, for a Tortoise ! He has also sent the curious lizard-tailed and large-headed Terrapin (*PLATYSTERNON MEGACEPHALUM*, Gray), heretofore only known from China ; and several living specimens of *EMYS OCELLATA*, Dumeril and Bibron ; and the very young of *EMYDA PUNCTATA*, Gray, (*Cryptopus granosus*, D. and B.). *EMYS OCELLATA* would appear to be the commonest species in the Burmese rivers ; and its naked parts are olive-grey, the crown blackish, with a yellowish-white v-like mark over the snout, continued as a supercilium over each eye and back upon the neck ; another similar line behind the eye, and both are often more or less broken into spots. Carapax dusky, mottled with yellowish ; a great black spot surrounded with a pale *areola* upon each discoidal plate ; dorsal ridges blackish with pale border : and lower-parts wholly yellowish-white. Some are brighter-coloured than others ; and the *ocelli* become proportionally smaller as they increase in size. The carapax of our largest specimen measures 9 by $6\frac{1}{2}$ in. ; but it probably is not nearly full grown.

Presented.

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Greenough's Physical and Geological Map of India.

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JOURNAL
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No. VI.—1855.

*On the Coins of the Gupta Dynasty.—By EDWARD THOMAS, Esq.,
B. C. S.*

Of the numerous coins, contributed by India at large, so admirably delineated by James Prinsep, and published in the early volumes of the Journal of the Asiatic Society of Bengal, the great majority were either conclusively deciphered and attributed by that versatile scholar, or advanced some stages towards such eventual explication and assignment. One of the few exceptions to this, almost unvarying success, presents itself in the class of money, I am now about to notice.

I refer to the small silver coins with the *reverse* device of a Peacock* of the type associated with the recognised Saurashtra model.

Prinsep, while he correctly classed these pieces, in virtue of their typical assimilations, freely admitted that he was unable to master their legends; neither has Professor Wilson afforded us any assistance in this direction, as none of these coins formed part of the collection of Mr. Masson, to the description of which the “Ariana Antiqua” was specifically devoted.

In the year 1848, I had occasion to advert incidentally to this series of Indian mintages, and on examination, detected the name of **BUDHA GUPTA** amid the imperfectly outlined letters of their le-

* J. A. S. B. III. Pl. XVIII. fig. 20, p. 230. Vol. IV. Pl. XLIX. figs. 10, 11, 12, p. 687.

gends.* In this state I allowed the enquiry to rest, until my attention was recalled to the subject by the discovery of a coin of a similar description in the ruins of the Sarnáth monastery by Professor Fitz E. Hall.† As in the progress of collecting, my own cabinet had by this time become enriched with new specimens of the type, and as I had the immediate advantage of access to Col. Stacy's ample collection, I was able by a careful collation of the isolated characters of the several varieties to identify the names and titles of three monarchs of the race of the Gupta Kings of Allahabad and Bhitári lát renown, whose gold currency is conspicuous in the various groups of the heretofore denominated "Canouj series."

* J. R. A. S. XII. 70, Pl. II. figs. 55, 57.

† But I have other obligations to acknowledge; to Mr. Hall I am indebted for explanations and assistance upon all doubtful or difficult interpretations of Sanscrit legends and inscriptions.

I myself pretend to the most limited knowledge of that language. I indeed, present the apparent paradox of being able to read and transcribe with precision, that which I only imperfectly understand, and it has happened thus; scholastic requirements taught me *Bengali*—intimate official intercourse, of five years' duration, with a people who wrote in *Hindi*, instructed me in all the modifications of that alphabet, from the polished penmanship of the bráhman and the current hand of the recorder of evidence, to the quaint contracts of village communities, and the crude writing of the ignorant, who, distrustful ever, would allow no foreign hand to tell their tale. The vehicle of expression varied almost in a like degree, from the glazed surface of the gold-spangled *Khuríah* to the petition of the northern Bhottias on their time-honored Birch-bark!

Thus broken in, Prinsep's Ancient Alphabets came to me as an earlier style of English might have done—thereafter, I gathered, as I went, such information as was necessary for my passing purpose; but, as Indian Numismatics did not exclusively occupy my attention, I abstained from devoting my time to acquiring a language that seemed likely to be of no other use to me.

Thanks have I too—and many—to return for the kindly aid of one, an almost stranger to myself, but united in devotion to our common cause, that most promising young numismatist, G. H. Freeing, Esq. C. S.

Whatever of novelties his already rich cabinet could boast of either in this or in other departments, have always been freely and unreservedly placed at my disposal. To Major Bush (24 N. I.) likewise my cordial acknowledgments are due for the liberal manner in which he at all risks, has forwarded for my examination his entire Gupta and Saurashtra series!

Before proceeding to notice these new silver coins,* it occurs to me, that it may be useful to enter upon a descriptive synoptical view of the entire suite of the Gupta mintages, exhibiting the various published types in serial order, and introducing, as opportunity may offer, any novelties that have become known, since the last article on the subject appeared in this Journal.† Moreover some such systematic classification is clearly demanded in this place, as not only are all previous notices of these coins scattered in detached numbers of the Journal, or inserted in other independent works, but our latest contributions necessitate a modification of the serial arrangement of the coins themselves, as well as amended appropriations of some of their numbers to the separate monarchs of the line.

I fear that I must claim indulgent consideration for the many imperfections of this article, for not only was the greater part of it the result of an after-thought, but when that portion was already prepared, new coins continued to pour in upon me even to the last, so that alteration and amendment had to proceed *pari passu* with the influx of fresh materials, possibly to the serious damage of some sections previously written and forwarded to the printers: add to this, my own contemplated departure from this country has prevented either my recasting this descriptive catalogue, or bringing it to a satisfactory completion in its most important aspect—the due and full explanation of the recently deciphered legends, the first transcript of which time has barely admitted of my submitting to Professor Hall, without the possibility of any further discussion or renewed reference to originals in doubtful cases.

The recorded Gupta Kings number nine, succeeding in the following order :—

- | | |
|-------------------------|-------------------------|
| I. Sri Gupta. | II. Ghatot Kacha |
| III. Chandra Gupta 1st. | IV. Samudra Gupta. |
| V. Chandra Gupta 2nd. | VI. Kumára Gupta. |
| VII. Skanda Gupta. | VIII. Mahendra Gupta ?‡ |
- and after an interval Budha Gupta.

* J. A. S. B. IV. Pls. XXXVIII. and XXXIX. Vol. V. Pls. XXXVI. and XXXVIII.

† J. A. S. B. V. 643, and VI. 319.

‡ My faith in the sufficiency of the identification of Mahendra Gupta as the

The data for this list will be found under the following references :
I. Allahabad lát, second Inscription (J. A. S. B. iii. 257 and vi. 969.)* "II. Mills" Bhitári lát Inscription (J. A. S. B. VI. 1;) III. 2nd Skanda Gupta Inscription Kuhao pillar (J. A. S. B. VII. 37;)
IV. The partially deciphered Skanda Gupta Inscription on the Rock at Junagad in Guzrat (J. A. S. B. VII. 348,) and new transcript of the same writing (Journal Bombay Branch Roy. As. Soc. April, 1842;) V. Chandra Gupta Inscription on the eastern gate of the Buddhist Tope at Sanchí near Bhilsa (J. A. S. B. VI. 455.) Udayagiri ditto "Bhilsa Topes" p. 151.† VI. Budha

successor of Skanda Gupta is based rather upon his coins, which seem naturally to follow suit, than upon the record on the Bhitári lát regarding which, Professor Mill remarks as follows : "This worthy worshipper of SIVA and DUARGA [Skanda Gupta] ascends to heaven: and his brother and the other chiefs, with mingled feelings of grief and affectionate allegiance proclaim his young child the heir to his father's crown and conquests. This youth is described as obedient to the Queen dowager his mother, as was Crishna to his mother Dévakí; but the part of the inscription that proceeds to speak of him is confused and unintelligible; neither does he appear to be once named; unless we conceive some letters of line eighteen to give his name thus: MAHESA-PRITI-GUPTA, (*the Gupta attached to Siva or beloved by Siva.*) He is probably the Mahendra Gupta whose name occurs in several of the newly discovered coins of this dynasty." (J. A. S. B. VI. 8.)

Major Cunningham suppresses MAHENDRA GUPTA altogether, though he does not assign his reasons for so doing, but in compensation he gives us two SKANDA GUPTAS, the second of whom he distinguishes by the title of *Lagraditya* or *Lokaditya*, making him succeed directly after the great SKANDA GUPTA for whom he reserves the title of *Kramaditya*! (Bhilsa Topes, 141.)

* Since the publication of my previous remarks on the *Dairā putra Shahi* of the Allahabad column Inscription (No. V. p. 389) I have had an opportunity of examining that monument, and have satisfied myself that the correct reading is दैव पुत्र षष्ठांश् षष्ठि

† Major Cunningham, in his work on the Bhilsa Topes has given a facsimile as well as an English transcript and translation of this Inscription; the two latter are as follows :

"Siddham samvatsare 82 Sravana-mása suklaekadasya "

"Parama-Bhattáraka Mahárájadhī CHANDRA GUPTA pádá na dá ta sya."

"Mahárája Chagaliga potrasya, Mahárája VISHNU-DÁSA putrasya."

Sanakánikásya Mahá (rája * * *)"

"Finished in the year 82, on the 11th of the bright half of the month of Srá-

Gupta Inscription on the Pillar at *Eran* near Ságor J. A. S. B. VII. 632.

I would premise, in introducing the following recapitulation, that I have indicated the doubtful readings of legends by the use of Roman type; where the transcript is given in Sanscrit letters, it is to be understood, that the decipherment is not contested. In the supplimentary observations appended to each classified exemplar, the latter character is also employed, as being most readily identifiable with the indeterminate originals.

GHATOT KACHA

CLASS A.—J. A. S. B. V. XXXIV. 12. Ariana Antiqua XVIII.
14.*

Obverse. Full length figure of the King, clothed somewhat after vana; [the cave] of him, bowing to the feet of the paramount, homage-receiving, Supreme Mahárája CHANDRA GUPTA the grandson of Mahárája CHAGALIGA, the son of Mahárája VISHNU-DÁSA, Mahárája (name obliterated of Sanakánika.)" p. 15."

As I do not place much faith in Major Cunningham's Sanscrit lore, I have submitted an independent transcript of his original Facsimile Pl. XXI. (Bhilsa Topes) to the scrutiny of Professor Hall, who has kindly favoured me with an amended translation.

The transcript finally adopted will be seen to vary but slightly, from the version in Roman type inserted above. The translation however differs very materially—at the same time I must freely admit the disadvantages I have laboured under in having to follow the Lithograph of a London Artist while Major Cunningham's transcript has been made, I presume, from the original record. Some slight liberties have also been taken by Mr. Hall in correcting, in the modern version, the errors of Sanscrit orthography to be detected in the ancient text.

सिद्धम् ॥ संवत्सरे द२ आवाण मासे शुक्लैकादश्यां परसम्भवारक सहाराजघि
(राज) श्रीचन्द्रगुप्तपदानुथातस्य सहाराज च्छगलिग पोचस्य सहाराज विष्णुदास-
युचस्य सनकानौकस्य सहाराज-

(" May it be) auspicious! On the 11th day of the light fortnight, in the month of Srávana, in the year 82 of —— the great King of Sana Kánika, son of the great King, Vishnu-dasa, (*and*) grandson of the great King, Chhagaliga, (*who, viz.* Chhagaliga was) son of the supreme monarch (*and*) paramount lord of great Kings The auspicious Chandra Gupta * *!"

* Coins known to the author, 1st, Tregear (No. 12, *above*,) 2nd, the late Lord Auckland, 3rd, British Museum, 4th, Col. Stacy, 5th, Major Bush.

the fashion of the Indo-Scythians, the right hand is extended towards a small Mithraic altar, the left clasps the symbol standard of the moon.*

LEGEND "Kama-naruttam-ja GHA (TOT) KACHA. *Son of an excellent man resembling Kama, Ghatot Kacha.* [Prinsep V. 645.]

Under the left arm { क
च

Reverse. Female figure erect, holding a flower in the right hand, and supporting a Cornucopia on the left arm. The latter is supposed to identify the figure with the Parvati of the APΔOKPO. *Reverse of No. 9, Pl. XXXVI. Vol. V. and No. 9, of XXXVIII. Vol. IV. Monogram Variant of 155. Ariana Antiqua.*†

LEGEND—सर्वराजोच्छेत्. The exterminator of all Rājas.

My collated decipherment of the obverse marginal legends gives the following result.

कर्मभिरुत्तमैर्जय कचोशुमवजिय ?

Professor Hall suggests,

कर्मभिरुत्तमैर्जयति कचोशुमवजिय ?

"Kacha, having overcome Ansu, reigns by virtue of excellent deeds."

* J. A. S. B. IV. 375. Harsha Inscription XVIII. "By whom was placed on the top of the house of SIVA, his own appropriate emblem, the golden figure of a full moon."

† The monogram in the three coins which have not been engraved in the Journal Asiatic Society Bengal, differs slightly from the form to be seen in fig. 12 above cited. Professor Wilson, in adverting to the general subject of Gupta monograms, offers the following observations.

"There is also another remarkable proof of the connexion [between the Gupta and the Mithraic series,] in the use of the same monogram that is found upon the coins of Soter, Megas, Kadphises and Kanerki. Agreeably to the purport which there seems reason to assign to these monograms, the recurrence of this emblem on all these coins should denote the place of their coinage; but, as above observed, we have no reason to place these princes on the west any more than we have to bring the Indo-Scythians far to the east of the Indus. It is therefore, perhaps, merely a proof of imitation, and has been introduced without any definite object. It is of use, however, in addition to other resemblances, as evidence that the coins of the Gupta princes succeeded immediately to those of the Mithraic princes." (A. A. 418.)

Ansu is probably *Asu* as there is no sign of the *Anuswára* on the coins.

There is a letter I have been unable to identify after the concluding व of the above transcript, which as far as mere forms go represents ए or औ.

The name of Kacha in the field has a long आ over the upper consonant.

In the present state of the enquiry, I abstain from any comments on the import of this obverse legend, which promises, if correctly rendered, to throw much light on the Gupta epoch in demonstrating more palpably whom this race conquered and whom they succeeded.

In regard to the reverse device, I may remark that Professor Wilson does not appear to have concurred in Lassen's* interpretation of the term APΔOKPO, as *Ardh-Ogro* half Siva, i. e. *Parvati*. He has not, however, directly contested the determination and under another form almost countenances such an association in speaking of the figure on the Kadphises coins as that of "Siva and his spouse in their composite character of *Arrdha-náriswárá*, Siva half-feminine."†

The exhibition of Parvati,‡ on their coins may be felt to be somewhat inconsistent with the Vaishnavi tendencies of the early Guptas, and is still more opposed to any notion of the Buddhist faith, the author of the Bhilsa Topes would claim for them;§ but, as Professor Wilson has observed, the adoption of this device may well have been a mere act of "imitation of a foreign design" irrespective of any aim at demonstration of creed; I myself have for long past contended, that more weight ought to be allowed, in estimating the significance of *Reverse* types—to local usage, and that their appropriation was ruled rather by the division of the country to which they at times became special, than to any question of the faith of the adopting dynasty. Striking examples of the disregard of the typical significance of devices, conjoined with an equal respect for national conventionalities may be cited almost on the same ground,

* J. A. S. B. 1840, p. 455, A. A. 361, 366, &c.

† A. A. 351.

‡ Num. Chron. VI. 20 —J. A. S. B. 1845, p. 437.

§ Bhilsa Topes, p. 157.

in the Sassanian retention of the identical Siva and Nandi, reverse of Kadphises* and in later days of the Ghaznavi maintenance unchanged of the Recumbent Bull of the Hindus on the Moslem coinage of Láhore.†

The recognition of this APΔOKPO figure as one of the forms of Parvati is conclusively set at rest by her appearing elsewhere as Durga seated on the lion, as well as by the subsequent modifications introduced on the Gupta *reverse* devices, where her form appears in association with the Peacock‡ primarily sacred to herself "and by her presented to her son Kumára," the Indian Mars,§ whose identity as that Hindu divinity is further manifested by the adoption of his second title of *Skanda* into the kingly nomenclature of the Guptas.||

It is necessary to advert for a moment to the variety in the types of the monograms on these coins. Those of Col. Stacy and Major Bush have the same symbol as the Ariana Antiqua piece, No. 14, Pl. XVIII. Prinsep's specimen, again, differs from these, in its two circular ornaments below the cross-bar, while its lower portion is

* Num. Chron. XV. 4.

† J. R. A. S. IX. 349.

‡ J. A. S. B. IV. Pl. XXXIX. figs. 28, 30. A. A. XVIII. 13.

§ Tod, I. 595.

|| Col. Tod in speaking of the various forms of Parvati adds the following comprehensive remarks on the subject :

" This Isis of the Suevi * * the Búdha and Ella of the Rajpoots ; in short, the earth, the prolific mother, the Isis of Egypt, the Ceres of Greece, the Annapurana (*giver of food*) of the Rajpoots * * * Gunga, the river goddess, like the Nile, is the type of fertility * * has her source amidst the higher peaks of the gigantic Himalaya, where Párvati is represented as ornamenting the tiara of Iswara ' with a beaming moon.'

" The mysteries of Osiris and those of Eleusis were of the same character, commemorative of the first germ of civilization, the culture of the earth, under a variety of names Ertha, Isis, Diana, Ceres, Ella. With the [Buddhists] the benevolent *Lacshmi*, *Srí*, or *Gauri*, is an object of sincere devotion * * such is the affinity between the mythology of India, Greece and Egypt, that a bare recapitulation of the numerous surnames of the Hindu goddess of abundance would lead us beyond reasonable limits ; all are forms of *Párvati*, or *Durgá Mátá*, the Mater Montana of Greece and Rome, p. 574 to 576, Vol. I."

completed by a perpendicular line. Mr. Freeling's coin further modifies the arrangement adopted in this last, by introducing a third circle in place of the vertical line. Simultaneously with these distinctions is to be noted the difference in the forms of that striking test letter ए m. in the several legends ; on the first cited pieces it is shaped like the ordinary Gupta ए of the Allahabad and other inscriptions, while on the latter it affects the form of the oldest type of the character, which retained its original identity in Western India to so much later a date.* The evidence of inscriptions seems to indicate that Bhilsa was one of the touching points of the two systems of writing at all events as regards this particular letter, as we find the Sanchi Inscriptions of Chandra Gupta† using the western character while other monuments of proximate locality employ modifications of the Gupta style of the letter.‡

The evidence of the inscriptions is also valuable in regard to the provincial forms of the ए, a reference to which is necessary as justificatory of the reading of the suffix to that letter on the coins under consideration.

The western system of writing continued the vertical down stroke of the character by a backward turn, and the same practice is followed in finishing the perpendicular line of the क.§ The eastern Inscriptions, on the other hand, exhibit the ए as a simple unswerving stroke from the mátrá; and the vertical portion of the क is, in like manner, wanting in the foot curve.|| The two coins above noticed, which use the eastern form of क and ए, give the ए a curve similar to the western type of that letter in order to express ए, and the coins which affect the western style of writing define the ए by a double curve in the opposite direction to that followed by the ordinary linear completion of the local form of the simple letter.

* Wathen's Plates, J. A. S. B. IV. 476.

† J. A. S. B. VI. 455.

‡ Eran Inscriptions, J. A. S. B. VII. 632 and 634.

§ Sáh Insn. VII. Pl. XV. Chandra Gupta *Bhilsa* VI.—Pl. XXV. Udayagiri Bhilsa, Topes," Pl. XXI. Wathen, IV. Pl. XL.

|| Allahabad, Bhitari, Kuháon, Budha Gupta, Toramána.

CHANDRA GUPTA 1st.

CLASS A. 1. J. A. S. B. V. XXXVIII. 7, A. A. XVIII. 1.
No. 1, (Freeling) weight 121 grains.

Obverse. The King standing erect, his left hand rests upon his *Khanda*, or straight sword, while his right is advanced in the act of casting incense on the usual miniature Scythic altar. A *Chattah*, the Indian emblem of sovereignty, overshadows his head. The attendant introduced below his left arm grasps the staff of the umbrella.

LEGEND. व? क? मादियं क्षतिमवजित्य श्रवरः

Mr. Hall proposes to read

विक्रमादित्यः क्षतिमवजित्य समरे

Vikramáditya, having conquered the earth in battle."

Reverse. Female figure, similar to that in *Class A.* with the exception that the left hand holds the flower, while the right extends a regal fillet. Monogram No. 159, A. A.

LEGEND. विक्रमादित्यः *Vikramáditya*, No 2, wt. 121 gr.

VARIANT. A second coin, also in the possession of Mr. Freeling, contributes the concluding portion of the *obverse* legend inserted above.

The Reverse device, though identical in character with that of No. 1, offers a modification in the attitude of the figure, which is here exhibited in full front view, and draped with the transparent garments of Mao and others of the Kadphises group (J. A. S. B. IV. XXXVIII. 10.) Though otherwise it is far more *Indian* in its treatment than the copy from Greco-Scythic models to be found on the other coin. The monogram also differs from that in coin 1, and assimilates to those found on Ghatot Kacha pieces, (J. A. S. B. V. XXXIV. fig. 12.) except that it has the second cross-bar as in No. 160, A. A. The Vikramáditya has but one क instead of the double letter क्क in No. 1.

These coins are attributed by Major Cunningham to Chandra Gupta the 1Ind; but on typical grounds alone, they must clearly be assigned to the first prince of that name; and I further draw the

distinction in regard to the titles that the full *Vikramāditya* seems to belong to the third monarch of the family, while the *Sri Vikrama* remains special with the fifth of the race.

CLASS B.—J. A. S. V. XXXVI. 15, A. A. XVIII. 3, Marsden, No. MLVIII.

Obverse. Device. King leaning on his spear, facing him is a female figure.

LEGEND. Indeterminate, under the arm { च
न्न

Reverse. Parvati, with cornucopia, seated on a lion.

LEGEND. पञ्चवयः “The five excellencies.”*

I assign these coins to Chandra Gupta the 1st, but with some hesitation, my chief ground for the attribution being the title on the reverse; there are, however, some minor typical indications that give strength to the attribution, especially the appearance on Mr. Masson's coin of the standard of the full-moon otherwise peculiar to Ghatot Kacha, or even supposing the staff, upon which the King's left hand rests, to be an ordinary spear or javelin, it is to be remembered that these weapons have definitively been superseded in this position, on the coins of Chandra Gupta the second of the name, by the bow, which he adopts from his predecessor Samudra Gupta. In Marsden's coin the family name of Gupta is inscribed in a line with the Chandra on the opposite side of the standard shaft, a practice which seems to have been discontinued after the introduction of the bow into the coinage devices by Samudra Gupta.

SAMUDEA GUPTA.

CLASS C.—J. A. S. B. IV. Pl. XXXVIII. figs. 16 and 17, Vol. V. Pl. XXXVI. fig. 14, A. A. XVIII. 6 and 9.

Obverse. The usual standing figure of the King; to the left of the field is seen the small altar of the Scythian prototype, associated

* Prinsep adds “to wit of a King. There is a fault in the orthography however * * The words should be written पञ्च वयः. Whether the word *chhavaya* “light” may have any allusion to the five luminaries of the Mithraic worship : the sun, the moon, fire, Jupiter and Venus, it is impossible to say : but that a King should possess five virtues, we learn from various Hindu authorities.

now, for the first time, with the Peacock Standard* (fashioned like

* Professor Wilson supposes this to be "a banner with a bird, probably Garuda, the winged vehicle of Vishnu, but as Skanda Gupta continues to use the emblem, its recognition as an exclusively Vaishnava symbol would create a difficulty in the way of any concurrence with the Rev. H. Mill's theory of the attachment of that prince to the 'opposite system' of worship—Saivism—(J. A. S. B. VI. 7,) but on the other hand, we are struck with the fact of Skanda Guptas retaining the name of *Bhāgavata* (Vishnu) on his silver coins. I think, however, that Prof. Wilson has, in another place, afforded a clue to the reconciliation of these apparent discrepancies, and that in speculating upon such sectarian divisions, we should more distinctly bear in mind that in the early development of Hinduism, there was but little of antagonism between the tenets of the two creeds; as it has been remarked in reference to the Agni Purana "being of the Vaishnava class: at the same time [that] it leans very favourably to the worship of *Siva*, as the *Linga*, and is full of *Tántrika* ceremonies in honour of that form of the deity. It was compiled therefore probably anterior to any wide separation between the Saiva and Vaishnava sects." (J. A. S. B. I. 82.)

As regards the Bird symbol, I think the most obvious and natural interpretation is to look upon it as designed to represent the Peacock, which appears with such frequency on the gold coins and occupies the entire reverse field of one type of the silver coinage.

Major Cunningham—as I have before remarked—claims for Chandra Gupta the second and Kumára Gupta a Buddhist belief, on the ground of their being designated in the Bhitári Inscription as "worshippers of the SUPREME BHAGAVAT," which, title he proceeds to argue, must apply either to Vishnu or Buddha, and he concludes, "but as Bhagavat is one of the commonest of the many titles of Buddha, the balance of evidence still remains very much in favour of Chandra Gupta's attachment to Buddhism" (Bhilsa Topes, p. 157). The author however seems to have forgotten that he had previously observed in reference to the deities of each creed, that "the common Brahmanical term, however, is *Bhagavat* and I believe that the use of *Bhagaván* is almost peculiar to the Buddhists," (p. 105, see also J. A. S. B. VI. 872 and VII. 283). It is further to be remarked, apart from many other vital objections—that, if his deduction is to stand, it will be equally necessary to convert Skanda Gupta from Saivism to Buddhism, in virtue of this same term as found on his coins, classes c. d. e. *infra*! Neither am I disposed to attach any more value to his other argument to the same effect, founded on the Sanchi Inscription of Chandra Gupta II Ind. J. A. S. B. VI. 456, inasmuch as even admitting Major Cunningham's *improved* reading of the opening passage of the Bhilsa Topes, 151, the rest of Jas. Prinsep's translation, which is not objected to, does not very clearly show how much the grant for Buddhist purposes was the direct act of the master or servant! and the assumed amount of £25,000, upon which much stress

a Roman Eagle). The King's left hand rests upon a Javelin.*

LEGENDS 1. Sri ? (a) parajita davaja [Prinsep IV. 635].

2. Vijayajatara Samara satamataga (ja). [Prinsep V. 646]

Under the arm { स
मु
द्र

Reverse. Párvati seated on a raised throne, with Cornucopia and regal fillet.

LEGEND—पर्वतः—‘The powerful.’

The first of these obverse legends was derived by Prinsep from Coin 16 above cited—the second transcript was obtained from No. 14, aided by other specimens. Professor Wilson [A. A. 424,] distrusts these readings, and apparently with good reason. The following gives the most exact detail of the isolated letters I have been able to compile from the specimens I have examined—

समरप्रतवत तवजय जतर

it is to be remarked however, that the 1st and 3rd of the three त's, at times show much more of the similitude of the ordinary letter न, but it will be remembered, that this is the correct type of the त in certain Western Alphabets.† Professor Wilson had suggested, (A. A. 424) doubtfully, the reading *Samara sata vataga* for fig. 9, but a coin of Col. Stacy's gives the *t* quite distinctly, where the Professor would read *g*.

is laid, dwindles down to a very unprincely donation under Jas. Prinsep's note of interrogation after the (thousands ?) [sic in orig.], the rejection of which reduces the total to £25 !

All the rest of the reasoning to this end depends upon Chandra Gupta's date, which Major Cunningham has certainly not yet succeeded in proving to rule from 400 A. D. to 430 ; but not only is this epochal determination based on the merest assumption, but up to this moment, there is nothing whatever to show, that the Chandra Gupta of the *Sanchi* and *Udayagiri* Inscriptions may not be the Sovereign *first* of that name in the Gupta family. The coins, we have some data for attributing to the several Chandra Guptas, but these inscriptions give us no aid towards any such identification ; not that I wish to contest the assignment, but it is fit that it should be known to be a clearly open question, and that all deductions based on the subordinate information, must be received with caution.

* The Javelin, the battle-axe and the arrow are enumerated among the weapons Samudra Gupta was in the habit of using as detailed in the Allahabad Inscription. See J. A. S. B. VI. 979.

† Dr. Stevenson, *Bombay Journal* (July 1853) pl. 17. *Kistna, Canara, &c.* J. A. S. B. VI. Pl. XIII.

Unpublished Variety of C. Weight 120 gr. *Major Bush.*

Obverse—device as in class C.

LEGEND—5 or 6 letters illegible त व त त व ज य जितरे प र ज त
द व ज one letter or more obliterated. On the sides of the Javelin



Reverse—as usual.

CLASS C. 1.—J. A. S. B. Vol. IV. Pl. XXXIX. fig. 19, A. A. XVIII. 7 and 8.

Obverse. The general outline of the device is the same as in Class C, except that the Peacock Standard is now adorned with Pennons—and a further modification occurs, in the substitution of a bow for the previously adopted javelin, while the arrow in the right hand of the King supersedes the Indo-Seythic Altar, which is henceforth altogether discarded.

LEGENDS are usually defective; Prof. Wilson detects the word *Vijaya* on the margin of No. 8, and there is a most tantalizingly long legend in continuation on coin 7—which it would be hazardous to attempt to read from any mere mechanical engraving.

Reverse—Parvati, as in class C.

LEGEND—अप्रतिरथः “The invincible in his War-Chariot.”

This term is applied to Samudra in the Allahabad lāt Inscription—**एषिद्वामप्रतिरथस्य** “whom in his war-chariot none in the world can rival or withstand.” (J. A. S. B. VI. 975).

Professor Wilson renders *Apratiratha* as the ‘unsurpassed warrior,’ “a genuine Sanskrit title.” (A. A. 420, 424).

CLASS C. 2—J. A. S. B. IV. Pl. XXXIX. 23, Vol. V. XXXVI. II. A. A. XVIII. 10.

Obverse. Figure of the King, in a slightly varied attitude, the right hand rests on the hip-joint, the left is placed on the head of the Battle-axe—to the front of the monarch is a standard surmounted by the device of a new moon below or beyond which, is the figure of a youth.* (The A. A. coin reverses the position of the two figures.)

* “Of him [Samudra Gupta], when the accepted son was pronounced to be the son of Dévi, daughter of Mahadaitya.” Bhitári Lát, J. A. S. B. VI. 6.

LEGEND. Kubháva paraguja, (Prinsep V. 645.)

Under the arm—


Reverse. The ordinary Parvati figure—but her feet rest on either “ seeming flame” according to the A. A. Coin; or “ the leaves of the lotus,” in the Prinsep specimens.

LEGEND, कृतन्तं परसु The battle-axe of Pluto.

Prof. Wilson in speaking of Prinsep’s decipherment of these legends, remarks “ his attempts to give a meaning to these syllables are very unsuccessful,” he himself suggests *Kratu-paraga* (A. A. p. 324, 325).

This legend, therefore, has hitherto presented an acknowledged difficulty ; however, the individual letters appear in their well-formed outlines to be readily susceptible of definite identification. The legend obtained from several specimens and determined by Major Bush’s coin, is कृतान्तं परसु राजाधिराज्. “ Sovereign of Kings whose battle-axe is like Pluto’s.”

A second coin in the Prinsep Cabinet, now in the British Museum, confirms this reading—with the important modification, that the second perpendicular line of the final consonant ष, in Parasu, is prolonged downwards and forms thus the alternative subjunctive vowel ए, which letter the continuos curved up-stroke of the same limb of the ष in coin 23, equally serves to represent. In this new coin the letter ए intervenes between the ट and the succeeding ष, forming the word *Rāja*, possibly used as the opening of *Rājadhirāja*. In regard to the s which I read in preference to Prinsep’s g,* a moment’s examination of coin 11. Pl. XXXVI. Vol. V. will satisfy the reader that if the second letter in the reverse legend is an admitted g, the final consonant of the same word should accord with it in form, if the latter is to be received as an identical letter—it will be seen that it does not do so—but, as more distinct evidence of my assertion may be needed, I am in a position to add that the unpublished coin above alluded to, gives in the reverse final the ष in all the distinct identity of the cross-stroke within

* J. R. A. S. XII. 75.

the double lines of the old g, which constitutes the essential distinction between the two letters.

CLASS D.—J. A. S. B. IV. Pl. XXXIX. fig. 26.

Obverse. The King is seated on a species of couch, or chair, the back of which is placed on the right hand side of the figure, in which arrangement it assimilates with certain forms of the throne of Párvatí. The Monarch is engaged in playing on the *Vina*, or Indian Lyre.*

LEGEND. महाराजाधिराज श्री स [सु] द गुप्तः

Reverse. Párvatí, with cornucopia and regal fillet, seated on an Indian *Morha*.

LEGEND. समुद्र गुप्तः

Class E.—J. A. S. B. IV. XXXIX. 31. 32. A. A. XVIII. 2. Freeling, W. 115 gr.

Obverse. A richly bedecked horse standing before an Altar.

LEGEND न व ज म धः राजधिराज दृथिवी विजयव ए; below the horse से.

Reverse. Female holding a *Chauri*, the figure is draped in the light garments of the Chandra Gupta Ist style (class A).

Legend अश्वमेध पराक्रमः The Hero of the Aswamedha.†

I have but little hesitation in attributing this coin definitively to Samudra Gupta.

The *Parakrama* title on the *reverse* would in itself go far to justify such an assignment, but the *obverse* title of *Prithivi Vijaya-tya* distinctly associates the identity of the monarch with Samudra, who has applied to him a similar style of eulogy in the Allahabad Pillar Inscription, where we read, श्री समुद्र गुप्तस्य सर्वदृथिवी विजयनितोदय &c.‡

* Samudra's "accomplishments in singing and playing" are eulogised in the 24th verse of the Allahabad Inscription. J. A. S. B. VI. 980.

† Wilson observes in regard to this type of coin, "That the steed represents one dedicated to the Aswamedha, or solemn sacrifice of a horse performed only by paramount sovereigns cannot be doubted, from the inscription Aswamedha-parakrama, he who has the power of the Aswamedha rites (A. A. 421.)" See also Tod, I. 63, 76, 583, &c.

‡ J. A. S. B. VI. 978.

A second specimen of this type of coin in the collection of Major Bush appears to vary the obverse legend—but the letters are too much worn to be satisfactorily deciphered.

CHANDRA GUPTA II Ind.

*Class C. 1.—J. A. S. B. IV. XXXIX. 18. Vol. V. XXXVI. 13.
XXXVIII. 9. A. A. XVIII. 4. Marsden No. ML.*

Obverse. Figure as above C. 2.

LEGENDS, imperfect. The following is a restored reading obtained from Col. Stacy's coins.

देव श्री महराजाधिराज श्री चन्द्रगुप्त. His Majesty.

Under the arm {च} “The auspicious sovereign of great
{न्द्र} Kings, Chandra Gupta.”

Reverse. Parvati seated on an elevated throne with cornucopia and regal fillet (in No. 18). The cornucopia is replaced by a flower in the later specimens.

LEGEND. श्रीविक्रमः “The illustrious hero.” (A. A. 420.)

Variant No. 1, No. MLVII. Marsden.

The obverse device presents a modification in the arrangement of the Bow, which is turned inwards and touches the side of the figure—while the चन्द्र is inscribed in the field outside of the bow-string. Legend, to the left, श्रीचन्द्रगुप्त.

Among a batch of twenty gold coins found at Gopálpur on the “Gogra river, on the site of the old Village Fort, ten miles west of Burhul,” in July 1854,* I observe a coin which corresponds very closely with this variant, and confirms in the most definite manner the reading of the right marginal legend already assigned to the original type C. 2—every letter is here indubitably to the following effect.

देव श्रीमहराजाधिराज

Class F.—J. A. S. B. V. XXXVIII. 6.

Obverse. King on horseback proceeding to the right, with lance at the charge.

* Seven of those coins were submitted to the Government N. W. P. in May last, by Mr. W. Roberts, the officiating Judge of Goruckpore—all these are from the mints of Chandra Gupta 2nd.

LEGEND. परम भः* श्रीचन्द्रगुप्तः:

Reverse. Parvati seated on an Indian *Morha*, with fillet and flower.

LEGEND. अजित विक्रम

KUMARA GUPTA.

Class C. 1.—Freeling (unpublished.)†

Obverse. Device as is usual in this type.

LEGEND on the margin * महाराजधिराज **

Below the arm { क
 { म
 { र

Reverse. Parvati seated cross-legged on a lotus, the right hand holds a fillet, or at times, a flower—the left rests either upon the knee or on the side of the figure.

LEGEND श्रीमहेन्द्रं Srí Mahendra.

Variety No. 1. J. A. S. B. V. XXXVI. 16. A. A. XVIII. 11. the name of the King is given, in this coin, as above, but it is placed in a line with the bow-string *outside* the arm of the figure as in variant No. 1, C. 2, of Chandra Gupta II Ind.

Variety No. 2. J. A. S. B. V. XXXVI. 20. A. A. XVIII. 12.

Obverse. Device as usual.

LEGEND * जयति महेन्द्रं * * under the arm कु.

Variety No. 3. An unpublished coin in the Prinsep Collection B. M.

Obverse. General device as in No. 2.

LEGEND on the margin: this I am unable, at this moment, to transcribe, but it concludes with the name of Kumára.

Reverse. Device as above.

LEGEND. श्रीकुमार गुप्तः.

Variety No. 4. Freeling. W. 125 gr.

Obverse. Device as in No. 2.

LEGEND * * * व—विजितावनिश्चनिपति. See silver coins infrâ, class 1 2 3 &c.

* परम भागवतो is one of the Prefixes to Chandra Gupta's name in the Bhitári Lát Inscription, J. A. S. B. VI. 4.

† This coin, though a cast, appears to have been taken from genuine original.

Variety No. 4. Col. Stacy. Wt. 126 gr.

Obverse. Device as usual. The name of कुमारगुप्त occupies the left margin. There is no name or initial under the arm.

Class G. Type. J. A. S. B. V. XXXVIII. 1.

(Unpublished coin of Col. Stacy's Cabinet.)*

Obverse. King facing to the right, armed with a bow, shooting a lion.

LEGEND. संहविक्रमकुमार [गुप्तरिधि] संह महेन्द्र

Kumara Gupta, of might like a lion's most prosperous [Mr. Hall.]

Reverse. Parvati seated on a lion, her right hand extends the fillet, the left, which rests upon her knee, holds a flower.

LEGEND. संहमहेन्द्र —Sinhá Mahendra.

Variety No. 1. J. A. S. V. XXXVIII. 8.

Obverse. LEGEND * न महेन्द्र जय *** श्री ***

Reverse. LEGEND महेन्द्र सिंह

Class H. 1. J. A. S. B. IV. Pl. XXXIX. fig. 25.

Obverse. The King facing to the left, armed with bow and arrow, attacking a lion.

LEGEND. महाराजाधिराज श्री ***

Reverse. Parvati with fillet and flower—seated on a lion.

LEGEND श्रीसंहविक्रमः Srí Sinha Vikramah.

Class G. 2. J. A. S. B. V. XXXVIII. 1, 2.

Obverse, as above, class G.

LEGEND—?

Reverse, as above, class G.

LEGEND. सिंहविक्रमः

Class I. J. A. S. B. IV. XXXIX. 28.

Obverse. Erect figure of the King, who has just discharged his arrow at a lion.

LEGEND "Sri bal parakrama" [Prinsep IV. 637.]

Reverse. Standing female, with flower in the left hand, the right is extended to a Peacock.

LEGEND. कुमारगुप्त *** Kumára Gupta **

* This coin—in weight 126 grains—is also a *cast* from a genuine original.

SKANDA GUPTA.

Class C. 1.—J. A. S. B. IV. XXXIX. 22. Vol. V. XXXVI. 17,
18. XXXVIII. 10? Marsden MLV.

Obverse, as in class, C. 2.

LEGENDS imperfect—under the arm { स्त्री
द्वे

Reverse. Parvati seated cross-legged on lotus flowers.

LEGENDS on 22 and 17, क्रमादित्यः Kramádityah.

Ditto on 10 and 18, श्रीस्कन्दगुप्तः Srí Skanda Gupta.

Class J. J. A. S. B. IV. XXXIX. 24.

Obverse. King to the left of the field, holding a bow—the Peacock standard occupies the centre and a female figure fills up the space on the right.

LEGEND, illegible.

Reverse. Parvati on lotus, with flower and fillet.

LEGEND. श्रीस्कन्दगुप्त—Srí Skanda Gupta.

MAHENDRA GUPTA.

CLASS F. 2. J. A. S. B. IV. Pl. XXXIX. 30, Marsden MLIX.

Obverse.—Horsemen as in class F, but without the lance.

LEGEND * * महेन्द्र गुप्तः.

Reverse.—Female seated on a morha, feeding a peacock.

LEGEND.—अजित महेन्द्र—Ajita Mahendra.

Variants. J. A. S. B. XXXVIII. figs. 3, 4, 5, A. A. XVIII. 16, 70.

CLASS F. 3. Unpublished. Freeling.

Obverse.—Device as is usual in this class, with the exception that the horseman is proceeding to the left instead of to the right.

LEGENDS undeciphered.

Reverse.—Parvati with peacock.

LEGEND—अजित महेन्द्र.

There is a gold coin in the Prinsep collection B. M. very similar to the type of class C. which has the following letters thus arranged under the left arm पु म द्वे The Reverse displays the usual

figure of Parvati with the remains of a *Greek* legend.

I next proceed with the various series of *silver* money of the Gupta princes.

SRI GUPTA?

CLASS *a*; Silver, weight 31 grains. Freeing, unique and unpublished.

Obverse.—Device, the original type of the Sáh head, apparently unchanged in outline or details.

LEGEND, as usual, in imperfect Greek characters, the concluding six letters of which alone are visible, thus—ACIOIO.

Reverse.—Device, a singular figure that may possibly represent the early design of the Gupta peacock as rendered by the local artists, beneath which is a linear scroll of three semi-circles similar to that seen in continued use on certain silver coins of Skanda Gupta,* above the main device are retained the Sáh cluster of stars and a minute half moon seemingly borrowed from the same source.

LEGEND.—**श्री — न्दगुपतक्रमदस्य श्रीगुप्तालबद्ध.** — — —

Prof. Hall proposes to amend the legend, thus—

श्रीनन्दगुप्त विक्रमेन्द्रस्य श्रीगुप्त कीलालेन्द्र — — —

To this he assigns the following translation : “The auspicious, KÍLÁLENDRA, son of the auspicious NANDA GUPTA, (who was) an Indra in prowess.” Thus reading the SRI GUPTA as the mere title ; I should prefer to consider it as the regal designation, accepting KÍLÁLENDRA as the personal name, the use of which may well have been discontinued in the subsequent family inscriptions. The name of Sri Gupta’s father is of but little import, we may, therefore, for the present let it stand as Nánda.

There is probably no coin in the entire Gupta series, of which we are at present cognizant, that possesses so much historical importance as this diminutive piece.

The absolute identity of the execution of the obverse device with that of the fixed Sáh model necessitates a concession of an almost immediate succession of some portion of the Gupta family to the

* J. A. S. B. IV. Pl. XLIX. figs. 4, 5, VII. Pl. XII. fig. 19; J. R. A. S. XII. Pl. II. figs. 43, 44; A. A. XV. 20. Prof. Wilson in speaking of the reverse device of this particular coin describes it as “an ornament like a disintegrated Chaitya.”

dominions of the Sáh kings of Suráshtra. I had formerly, while reasoning upon the numismatic materials then at command, been led to conclude that a considerable interval might have elapsed between the fabrication of the Sáh exemplars and the deteriorated Gupta imitation of that style of coinage, but I am now fully prepared to amend this inference, and to approximate the later Sáh monarchs very closely to some of the early members of the Gupta race; to carry this out satisfactorily I am aware that I must either modernise the Sáhs from my first assignment of date or elevate ten Guptas to a higher degree of antiquity than I have previously claimed for them.*

It is not my intention, neither have I time at command while this paper is being put to press, to enter into the general re-consideration of the true Sáh epoch, it is sufficient for the present to indicate freely the new bearing assumed of the entire question under the evidence, contributed by the type of this unique coin.

KUMÁRA GUPTA.

CLASS b; J. A. S. B. VII. Pl. XII. 16, 17; J. R. A. S. XII. Pl. II. 39, 40, 41, 42; A. A. XV. 17, 18.

Obverse.—Head of the king in profile: the outline and design are nearly identical with the Suráshtran prototype, the mintage of the Sáh kings—at the back of the head is ordinarily to be seen a mutilated portion of the Scythian title PAO NANO. This important legend affords another link in the direct association of the Guptas with the Indo-Scythians, which is here the more marked, in that, while the device itself is servilely copied from the Sáhs, their obverse Greek legends are superseded by this new title.

Reverse.—It is difficult to determine satisfactorily what the emblem occupying the *Reverse* field may be intended to typify, but the most plausible supposition seems to be that it displays an advance upon the conventional representation of the peacock under

* I have had so much to object to in Major Cunningham's arguments and inferences, that I may here complimentarily mention that, he has already contended for a direct and immediate succession of the Sáhs by the Guptas, *Bhil. Topes*, p. 148.

Western treatment, following out the artistic notion of that bird given in Srí Gupta's coin.

LEGEND.—परम भगवत् राजाधिराज् श्रीकुमार गुप्त महेन्द्रस्य.

Parama Bhagavata Rájádhírúja Srí Kumára Gupta Mahendrasya.

The second word of this legend is the only portion of the whole that is at all open to question ; it has been read *Bhánuvíra* by Prinsep,* but this is not by any means a satisfactory interpretation. The 1st and 3rd letters are fixed and constant in the various examples, and are properly rendered in each case as भ and व ; the second and fourth letters vary considerably in outline on the different specimens ; the second letter I have never yet met with in its perfect shape as ण when tried by the test of the ण in Gupta, indeed the majority of the coins display it more after the form of a ङ, as that consonant is found later in the legend in Mahendrasya. The same remark also applies to the final त. I see that Prof. Mill has conjecturally supplied the word *Bhagavata* in the prefix to Kumára Gupta's titles on the Bhitari lát (VI. 4) but Prinsep's Facsimile of the inscription though it accords the needful space for the exact number of letters, gives the final as a manifest त ; in saying this, however, I must remind my readers that in the alphabet in question, the slightest possible inflection and continuation of a line constitutes the essential difference between the two letters ङ and त, and on the other hand the local copper plates of the Valabhis render the ण very much after the shape of the Eastern ङ, while the indigenous त is but little different from the ङ of the coins under reference. And finally as the words *Parama Bhagavata* appear in all their indubitable majority on the succeeding coins of Skanda Gupta, we may fairly assume a mere imperfection in the expression of the individual letters and leave the word as it has been entered in the legend above.

The coins under notice are not always complete in the Sanskrit legends ; for instance, an otherwise very perfect piece in the cabinet

* J. A. S. B. VII. 256. Prof. Wilson A. A. 412, has suggested *Bhataraka* (?) which the Udayagiri inscription (Bhilsa Topes, 151) rather recommends to our notice.

of the Royal Asiatic Society has the word राजाधिराज abbreviated into राजाध; and No. 39 has the same word contracted to राजा-धि॒र.

Since my last notice of these coins in the J. R. A. S. in April, 1848, I have had an opportunity of examining a set of very perfect coins, thirteen in number, which were found at Ellichpore in 1851, and presented to the late Sir H. M. Elliot. These do not however, add any thing to our previous knowledge of the subject. Their average weight was 29 grains, the highest being 32 grains.

SKANDA GUPTA.

CLASS c; J. A. S. B. VII. Pl. XII. 18, 19; J. R. A. S. XII. Pl. II. 43, 44; A. A. XV. 20.

Obverse, as in class b. Kumāra Gupta, but the execution has greatly deteriorated; on some specimens traces of the word NANO are still to be seen.

Reverse.—The device in this class of money, appears to offer a more direct imitation of that of the Sri Gupta pieces, than did the intermediate Kumāra reverse types, these latter are seen to reject the foot scrolls and to vary the details of the centre figure to a considerable extent.

LEGEND—परम भगवत् श्री स्कन्द गुप्त क्रमादित्य

Parama Bhagavata Sri Skanda Gupta Kramaditya.

PRINSEP, in his collated reading of the legends on these coins (J. A. S. B., vii. 356), adopted the letter म (for महा॑) as occurring after the word भगवत् [or भगदत् as he made it], which he found to be followed by the title of राज, which precedes the name of the monarch. This rendering, he would seem to have drawn from fig. 29, Pl. II., STEUART (J. R. A. S., 1837); but as the like letters do not generally recur, I have marked this as the exception rather than the rule.

The weights of these coins vary from 23 to 29 grains.

CLASS d; J. R. A. S. XII. Pl. II. 45, 46; A. A. XV. 19.

Obverse.—Crudely outlined head, with traces of the title NANO in front of the profile.

Reverse.—Figure of Nandi identical in form and position with the seal symbol of the Valabhi family as found on their copper-plate grants. (J. A. S. B. IV. Pl. XL. and p. 487).

LEGEND—[restored].

परम भगवत् श्री खन्द गुप्त क्रमादित्य

Parama Bhagavata Sri Skanda Gupta Kramáditya.

These legends are frequently very incomplete, varying in the number of letters in each; but, as I have already sufficiently adverted to this subject,* I need not repeat my observations in this place.

The standard of these coins is very uncertain, rising from a weight of 21 to 30 grains.

CLASSES *e. f. g.* [The references are prefixed to each variety].

Obverse.—The usual head, generally ill defined, but still identical in many respects with the original device on the obverse of the Sáh medals; it is occasionally also accompanied by distinct traces of the word NANO.

Reverse.—Central symbol in the form of an altar, which is supposed to represent the common altar-shaped receptacle of the sacred Túlsí tree of the Hindus. Legends restored—

CLASS *e.*; J. R. A. S. XII. Pl. II. 49.

परम भगवत् श्री खन्द गुप्त क्रमादित्य

Parama Bhagavata Sri Skanda Gupta Kramáditya.

CLASS *f.*; J. R. A. S. XII. Pl. II. 50.

परम भगवत् श्री खन्द गुप्त परमादित्य

Parama Bhagavata Sri Skanda Gupta Paramáditya.

CLASS *g.*; J. R. A. S. XII. Pl. II. 51.

परम भगवत् श्री विक्रमादित्य खन्द गुप्त

Parama Bhagavata Sri Vikramáditya Skanda Gupta.

“There are between seventy and eighty specimens of these various Túlsí device Skanda Gupta coins in the Prinsep collection, B. M. They are commonly but carelessly fashioned, and unevenly struck. The letters of the legends, however, are in high relief, and unusually well preserved, though there is at the same time a decided absence of uniformity in the expression of many characters of analogous value, and their general outline is remarkable for a degree of rude-

* J. R. A. S. XII. p. 66; J. A. S. B.? ?

ness, similar to that already noticed by Prinsep* as existing in the coeval alphabet of the 3rd or Skanda Gupta Inscription on the Girnar Rock.

The irregularity in the completion of the legend noted as occurring on Skanda Gupta's coins with the Bull reverse, appears in a still greater degree in those of the present class.

The weight of this class of coins is more than ordinarily unequal, rising from $22\frac{1}{2}$ to 33 grains!

Though not properly susceptible of classification with any Gupta series of coins, it is needful to notice in connexion therewith a species of money which seems to constitute an independent derivative from the same Saurastrian type that served as a model for the local currency of the Guptas in certain Western provinces of their empire.

I allude to the pieces figured as Nos. 6 to 8 and 9, Plate XLIX. Vol. IV. J. A. S. B.† Prinsep at the moment of their publication‡ scarcely attempted any decipherment of the certainly very unpromising legends, and was equally at fault in regard to the reverse device which he described as "a symbol in the form of a trident:"§ when subsequently he came to take up the general subject of the Sáh and Gupta silver coinage in full detail,|| he still essayed no advance upon the attribution of this offshoot of their common prototype. In my paper on the Sáh kings¶ I made some slight progress towards determination of the purport of the legends, and apart from the typical coincidences, was able to demonstrate more precisely the Sáh association in the decipherment of the words राज्ञा महा क्षत्रपते on the margin of the best preserved specimen of the series.

* J. A. S. B. VII. 348.

† Other examples of this currency will be found delineated in J. R. A. S. IV. Pl. II. fig. 30, XII. Pl. II. figs. 35 to 38.

‡ December, 1835.

§ Prinsep writes "figs. 6 to 9 are one step further removed from perfection. The legend where best preserved, as in fig. 9, appears a mere repetition of the letter *p*, with the suffix *r*, *ri*, and *y*, * * * the central symbol has the form of a trident. Lieut. Burnes informs me that several hundreds of these three species of coins were found in Cutch in 1830, in a copper vessel buried in the ruins of *Puragarh*, twenty miles west of Bhoj, a place of great antiquity, and yet marked by the ruins of a palace and a mint." IV. 687.

|| J. A. S. B. VII. April, 1838.

¶ J. R. A. S. XII. 15th April, 1848.

A coin of Mr. Freeling's that I have now before me, of apparently early date presenting a well defined and nearly complete legend, promises materially to advance the enquiry and to furnish a key to the strangely distorted letters stamped on the later emanations from the parent mint. I proceed to describe the piece in the ordinary form.

Silver, weight 27 grains.

Obverse.—The usual Sáh head, apparently but little modified. This surface of the coin is damaged, but fully one-half the marginal space, around the profile, remains uninjured and in the total absence of any sign of a letter confirms my previous supposition,* that the use of the Greek legend was not extended to this class of coin.

Reverse.—Device, a barbarized imitation of the Minerva Promachos of the Bactrian Coinage.

I was once disposed to look upon the singular figure on the reverse of those coins as the Buddhist device of a man; I was led to this conclusion by the similarity of the form of the figure sketched by Jas. Prinsep, in fig. 21, Pl. XVIII. Vol. III. J. A. S. B. to that occurring on the Behat type of coins;† but I now observe that Prinsep, in his second engraving of the same coin IV. Pl. XLIX. 9, omits the left arm, in its downward position, which constituted the most essential point of Behat identity.

LEGEND. यह भु नद्दकसरज्ज महद्वचपरमदवकवाभसदमन

Variants? श्रीः अ ट

ह कृ

Prof. Hall, confesses himself fairly baffled by this legend: I therefore allow it to stand as originally transcribed from the coin, trusting that new specimens may hereafter aid in the due interpretation. The configuration of certain letters in these legends however demands a passing notice. The character which Prinsep took for *Pr.* &c., is now satisfactorily proved to be a अ; the form is peculiar, but still it bears sufficient affinity to the general idea of the Gupta अ. In the later specimens of the coinage, its upper section

* "One item seems safely deducible from the unoccupied margin, to be found around the bust in the broader coins, viz., that the use of Greek or its attempted representation was here discontinued." J. R. A. S. XII. 63.

† J. A. S. B. IV. Pl. XXXIV. 16, Pl. XXXV. figs. 45-47, &c.

is distinguished from the ordinary ए by the rounding off of the lower portion of the first down-stroke, while the ए itself is squared at the base. The nearest approach to identity with this Numismatic ए is to be found in the outline of that character as expressed on the Udayagiri Inscription, but it must be remarked that this similitude affords but little aid towards determining geographical limitation, as the majority of the letters of the inscription itself are exceptional, and do not accord with the characters of the other writings of the same locality. The ए of these coins takes the same shape as those on Kumára's silver coins, Class *b*, above adverted to. The remaining letters, as far as they have been definitively identified, seem to follow the ordinary Sáh style.

My readers may consider these details tedious: they are necessarily so, but to justify myself for inflicting them, I may mention that while I am disposed to demur to Prinsep's conclusion, that the date of all Indian writings may be invariably determined by the mere forms of their letters, I am on the other hand inclined to believe, that under a comprehensive and well considered system of comparison of alphabetical characters, traced down from their common origin through existing monuments,* to the fixed modern forms, we may determine with some precision the section of the country, if not the kingdom,† to which any given inscription may owe its origin.

* The Bhilsa monumental writings in their variety might be supposed to militate against any such possible system of identification, but as has been before remarked, this sacred site seems to have been held in equal honor by eastern and western races, who possibly employed the indigenous artists to copy the originals peculiar to their several countries; if they did not even employ engravers from their own land.

† In seeking to discover the locality whence these coins emanated, it may be useful to note the information contributed by Hweun Thsang on the subject of the divisions of the western kingdoms: it is to be remembered, that though the supremacy may have varied, the classification of states probably followed the ancient boundaries.

Leaving Maháráchtra, Hweun Thsang is described as " se dirigeant au nord-est, il fit environ mille li, passa la rivière Nai-mo-t'o (la Narmmadâ) et arriva au royaume de Po-lou kie-tchen-p'o (Baroukatch' éva—Baroche.) De là, marchant encore au nord-ouest, il fit deux mille li et arriva au royaume de Mo-la-p'o (Malaya) * *

I now approach the original object of the present paper, viz. the peacock reverse coins which form the appropriate conclusion of the Gupta series, in the double aspect of commencing with the designation of the VIth Monarch of the succession, and in presenting us with the sole medallic record of the latest king named in the inscriptions.

BUDHA GUPTA.

CLASSES 1, 2 and 3.

Obverse.—The usual head in profile, manifestly imitated from the normal Saurashtran device; the close fitting cap or helmet of the proto-type is however at times degraded into a mere skull-cap, the long hair is arranged after the manner of the Sáh model and the collar of the dress is likewise retained in its original identity. The general inferiority of the die-execution is most marked, and the Indian leaning of the artist is exemplified in the expression given to the eye, which instead of its once classic form is here exhibited in the almond-shaped, full-front optic placed well over the side of the cheek: in the marginal space outside the profile, are to be seen three letters or figures, which may be appropriately reserved for future

Suivant la tradition, le trône était occupé, il y a soixante ans, par un roi nommé *kiač-ji* (cīlāditya,) * * pendant les cinquante ans qu'il resta sur le trône. * * De là il fit de deux mille quatre cents à deux mille cinq cents li au nord ouest, et arriva au royaume de *O-teh'a-li* (Atali ?) * * De là il fit encore trois cents li au nord ouest, et arriva au royaume de *Kitch'a* (Kitā). [Ce pays est soumis au royaume de Ma-la-p'o. Si-yu-ki XI. 16.] De là il fit mille li au nord et arriva au royaume de *Fa-la-pi* (Valla bli).

“Le roi actuel est de la race des *Tsa-ti-li* (Kchatriyas); il est le gendre de *Chi-lo'-o-tie-to* (Cīlāditya) roi de *Kie-jo-kio-che* (Kanyā koubdeja); son nom est *Tou-lou-p'o-po-i'o* (Dhrouvapaṭou). * * De là il fit sept cents li au nord-ouest et arriva au royaume de *'O-nan-i'o-you-lo* (Anandapura). De là il fit cinq cents li au nord-ouest et arriva au royaume de *Sou-la-tch'a* (Sourāchṭra) [Il est soumis au royaume de Falāpi Siyuki X. 18]. De là il fit dix-huit cent li au nord-est et arriva au royaume de *Kiu-tche-lo* (Gourdjara). [Ce roi est de la race des Kchatriyas *Siyu ki*, XI, 18]. Ensuite, il fit deux mille huit cents li au sud-est et arriva au royaume de *Ou-che yen-na* (Oudjayana). [Le roi est de la race des Brâhmaṇes; *Siyu ki*, XI. 18].

De là il fit neuf cents li au nord-est et arriva au royaume de *Mo-hi-chi-fa-lo-pou-lo* (Mahēśvarapoura). [Le roi descend d'une famille de brâhmaṇes]. De là, tournant à l'ouest, il revint au royaume de *Sou-la-tch'a*. ”

examination in conjunction with the Indian Numerical series at large to which their various examples contribute an independent section.

Reverse.—Device, a full front view of a peacock with expanded tail.

LEGENDS.

CLASS 1. *Kumára Gupta*, J. A. S. B. IV. Pl. XLIX. figs. 10, 11 and 12.

देवं जयति विजितावनिरवनिपति कुमार गुप्ता

Dev(o) jayati vijitávanir avanipati(h) Kumára Gupta “His Majesty KUMÁRA GUPTA, who has subdued the earth, rules.”

CLASS 2. *Skanda Gupta*, J. R. A. S. XII. Pl. II. figs. 52, 53.*

विजितावनिरवनिपति जयति देव खान्द गुप्त य

Vijitávanir avanipati(r) jayati deva(h) Skanda Gupta-y.

CLASS 3. *Budha Gupta*, J. R. A. S. XII. Pl. II. figs. 55, 57.

देव जयति विजितावनिरवनिपति श्री बुध गुप्त

Dev(o) jayati vijitávanir avanipati(h) Sri Budha Gupta.

When once fairly deciphered, these legends will be seen to present but few difficulties. The lapidary inscriptions have already proved that the Gupta artists indulged in faulty Sanskrit orthography as well as in grammatical errors, so I need not detain my readers by any comments upon minor imperfections, while the general sense of the legend is sufficiently clear. I must mention that in my devanágari transcripts, I have adhered servilely to original legends impressed upon the coins; the version in the Roman type is corrected up to Sanskrit requirements.

There is a superfluous य (or possibly a म after the गुप्त on Skanda Gupta's coins, the use of which is not apparent, but which clearly takes the place of the final O in Kumára's legends.

I may note that Kumára Gupta's coins display both the old form of म and the more specially Gupta outline of that character.† The य is also seen in its transition state from the triple lined letter of

* I should mention that my references to the published engravings of the coins of Skanda Gupta and Budha Gupta are based on my own facsimiles copied from the coins themselves.

† J. A. S. B. IV. Pl. XLIX. figs. 10 and 12.

early days to the almost modern form, while at times it appears on Skanda's money as a character not easily distinguishable from the later Kumára M, just adverted to. This extensive modification of the ए in the numismatic alphabet is the more curious, as the corresponding lapidary character retains all the essentials of its ancient outline, throughout the Gupta inscriptions, from the Alla-habad pillar to Budha Gupta's record at Erun and even on to Tora-mána's inscription at the same place.

The weights of these coins run as follows:—

9 fair specimens of Kumára's mintages average 30.1 grains, highest weight 33 grains.

8 fair specimens of Skanda's coinage average 31.7 grains, highest weight 35 grains.

Dr. Swiney's coin of Buddha, No. 55, Pl. II. J. R. A. S. XII. weighs 32 grains.

Their relative rarity may be approximately inferred by the numbers of the coins of each prince in the Stacy, my own, and Mr. Freelings collections.

	Stacy.	Thomas.	Freeling.
Kumára's	6	6	7
Skanda's.....	4	4	1
Buddha's.....	0	0	0
Doubtful,	2	1	1
	—	—	—
Total,....	12	11	9

These coins of the peacock type would seem to have formed the recognised silver currency of the central and Eastern provinces of the Gupta dominions, for though they are found in limited numbers amid the hoards of the local coinage of the Western states. The relative proportions seem to be reversed in the *finds* of the Eastern districts of the Gupta empire. Three in my own collection have chiefly been obtained from Kanouj itself, while Mr. Freelings centre of operations is Humeerpore on the Jumna.*

* Prinsep remarks on this head, "Figs. 10, 11, 12, are of a different type, though nearly allied to the former; they are not only found in Gujrát, but at Kanouj, Ujjain, and generally in Upper India. Lt. Cunningham has just sent me impressions of five very well-preserved specimens procured at Benares," IV. 687.

It may be useful to summarize in this place the proved dates, discovered on the various specimens of the peacock coins that I have had an opportunity of inspecting—leaving the consideration of the grounds whereon these determinations are based for future scrutiny.

Kumára's coins bear ciphers for *one hundred and twenty and one* = 121; others display figures for 124—one piece discloses a unit for *five* and another a sign which I doubtfully class as a *nine*, but in both these instances the decimal cipher is obliterated.

Skanda Gupta's money continues the series in the use of the same figure for *one hundred*, with the addition of two new symbols in the decimal place.

Buddha Gupta in like manner dates in the first century of the given era, but the value of his second cipher is undetermined.

The inscription at Sanchi, it is to be remembered, bears date 165.

COPPER COINS.

I notice the copper coins of the Guptas merely to complete the series, as they add nothing of value to the historical enquiry.

Prinsep remarks that they are “much more scarce than the gold coins of the same age, and hitherto only those of one individual of the family have been met with.” Varieties of these pieces are engraved in figs. 11, 12 and 15, Pl. XXXVIII. Vol. V. J. A. S. B. These bear the name and titles of Chandra Gupta on the reverse, which may be restored in full as महाराज श्री चन्द्रगुप्त. Nos. 13 and 14, of the same plate in addition to the name have श्री विक्रमा-दिव् on the obverse, inscribed below the bust of a female offering a flower.*

TORAMANA

CLASS 4. S. wt. 32 grains, unique and unpublished.

Obverse. The usual Sáh type of profile but with the artistic merits still further diminished. The head is turned the reverse way and looks to the left.

In front of the profile are seen the figures for eighty with the uncertain symbol entered last in the line of Gupta units.

* See also A. A. 427.

Reverse.—Device. Peacock greatly debased and facing more to the left.

LEGEND. वृ नीवयकवर्द्ध श्री तोरमाण

It will be remembered that this king TORÁMANA* is adverted to in the following terms in the inscription on the Varáha image at Eran in Bhopál. “When the great rája TORÁMANA, the very famous and beautiful, the king of kings, governed the earth; in the first year of his reign, on the 10th day of *Phálguna*. ”

Jas. Prinsep, in noticing this monument, in connexion with the Budha Gupta record on the associate pillar, prefaces his translations with a summary of the relative dates of each inscription as illustrated by their respective contexts.† He observes, “The temple was built by Dhanya Vishnu the confidential minister of Rája Mátri Vishnu, the son of Hari Vishnu, grandson of Varuna Vishnu and great grandson of Indra Vishnu; in the first year of the reign of Torámaná of *Suráshtra* (?) : and (sic)

“The pillar was erected by Var'dala Vishnu, the son of Hasti Vishnu, also grandson of Varuna Vishnu, and at the cost of Dhanya Vishnu on the 14th of Asarh in the year 165, in the reign of *Bṛ-*

* Prinsep writes the name Tárapáni: I follow Major Cunningham's emendation, which indeed is necessitated by the legend of the coin (Bhilsa Topes, 164).

† I also transcribe Major Cunningham's observations on this subject:

“We learn from the inscriptions on the colossal *Varáha Avatar*, at Eran, that the paramount sovereign *Toramána* possessed all the country about Bhupál and southern Bundelkhand not many years after the elevation of Budha Gupta's pillar; for the pillar was erected by Vaidala Vishnu, at the expense of his cousin Dhanya Vishnu, while the colossal Boar was set up by Dhanya Vishnu himself. The death of Budha Gupta, and the accession of *Toramána*, therefore both took place during the life-time of Dhanya Vishnu. But there must have been an interval of some years between the two events, as Dhanya's elder brother, Mátri Vishnu, who is not even mentioned in the pillar inscription, had since assumed the title of Mahárája, and was then dead. Dhanya himself then became regent, apparently to the young prince, *Toramána*; for, in another inscription from the Fort of Gwalior, I find *Toramána* described as the son of Mátri Dásá and the grandson of Mátri kula, who is probably the same as Mátri Vishnu [?]. As the celebrated hill of Udayagiri is mentioned in the Gwalior inscription, there can be little doubt of the identity of the two *Toramánas*, and of the consequent extension of the principality of Eran to the banks of the Jumna.” Bhilsa Topes, p. 164.

dha Gupta in *Suráshtra*, comprehending the country between * * the *Kalindi** or Jumna and the *Narmada*, or Nerbudda."†

Prinsep was clearly disposed to infer that the temple was built prior to the erection of the pillar, and in this supposition I myself was formerly inclined to concur;‡ but the degradation of the type

* I had previously expressed distrust in the accuracy of the transcription of this name by JAS. PRINSEP (J. R. A. S. XII. 71,) I did so on the very justifiable ground that his own accompanying facsimile did not warrant such a rendering. Major Cunningham has since examined the original inscription and has satisfied himself that the word is Kálindí (Bhilsa Topes 163.)

† J. A. S. B. VII. 632.

‡ I insert the entire passage. "Budha Gupta the very name that is found on the inscription on Bhím Sen's Pillar at Erun, near Ságör. Assuming this designation to be correctly read, the collateral evidence derived from the inscription coincides sufficiently with the indications offered by the coins themselves. From the former we gather that Budha Gupta held the country lying between the Nerbudda and a river it has been proposed to identify as the Jumna; no information is however afforded as to the whereabouts of his seat of government, nor can the geographical boundaries, thus defined, be said to convey any very definite knowledge of the real extent of the dominions adverted to. Prinsep considered that Surashtra should be held to have constituted a portion of this king's possessions, but the expressions in his own translation of the inscription—even admitting it to be an accurate rendering—are far from implying any such condition; the occupation of land touching these two rivers, taking Ságör as anything like its centre, would encircle comparatively narrow limits, and would not by any means of necessity embrace the whole land to the western coast.

If Budha Gupta is to be looked upon as a scion of the ancient family of the Guptas, whose might is chronicled on the Láts of Allahabad and Bhitári, and on the Rock of Junagarh, it is clear by his subjects' own showing, that he possessed a sovereignty much reduced in extent from the empire originally ruled over by his predecessors in the palmy days of the race.

In addition to the Pillar record, there is also an inscription on the temple at Eran, near which the Pillar itself was erected. From the incidental notices to be found in these monumental writings, it would appear that their execution must have been very nearly contemporaneous; the one work having been undertaken "by," the other at the "cost of," a certain Dhanya Vishnu. In the temple inscription, which is probably the earliest of the two, it is stated that the edifice itself was built in the first year of the reign of Tárapáni, the suzerain then acknowledged in this part of the country. The writing on the pillar, on the other hand informs us, as has been already stated, that at the time of its endorsement, Budha Gupta was the lord paramount." J. R. A. S. XII. 71.

of Taramána's imitation of the Gupta Peacock coins places the matter beyond a question, and would leave me no alternative but to conclude that Toramána *followed* Buddha Gupta, after some inconsiderable interval—but my late admission of Buddha Gupta into the direct succession of the Gupta kings, which has been freely conceded on the absolute identity of the style of his silver money with that of the newly deciphered pieces of Kumára and Skanda Gupta, has already sanctioned the result claimed by the present discovery.

But this unique specimen of Toramána's mintage furnishes us with further matter of speculation, in such portion of the date as still remains on its surface. The cipher for hundreds, which should appear opposite the forehead of the profile, seems to have been worn away in the course of the ordinary currency of the piece. The decimal figure is sufficiently well preserved, and though it would be possible to read it as the 5 for *one hundred*, yet both its position and its outline alike claim for it the value of *eighty*; lowest in order appears a symbol which equally suggests a remote doubt, and were there any figure or portion of a figure in the space below, it might be taken for a 0, but not only is there no cross-bar to complete that sign, but there is a semblance of an up-stroke beyond the second vertical line, which assimilates it with the Gupta unit entered last in the line in the plate of facsimiles.

If these interpretations be correct, we have Budha Gupta dating up to 165, and Toramána issuing coin in what we may fairly conclude to be *one hundred and eighty* odd, or about the very period that might have been selected for his epoch under other grounds.

The style of the coin legend also demands brief notice. It will be seen that the Gupta numismatic practice of arranging both the short and long vowel *i* above the line of matras, (or more frequently omitting them altogether) is here so far modernized that the short f is brought down before, and the long t after the consonant to which it is attached. The Budha Gupta Inscription at Erun like the Skanda Gupta writing at Kuháon still continues to use the *old* form of the long vowel, while the Toramána record symbolizes the sound by a character similar to that on the coin.

The short vowel, on the other hand, is already fully subjected to the modified mode of expression in the Buddha Gupta inscription.

The Gujrát copper-plates of later days do not however, accept these new forms, but adhere to the general outline of the ancient superposed vowel.*

Further remarks on the different species of Orang-utan.—By

EDWARD BLYTH.

Our museum having received from Sir James Brooke of Sarawák the superb donation of seven skeletons of large adult Orang-utans, I hasten to communicate the results of my examination of them, as a sequel to my former memoir on the genus published in the 22nd volume of the Society's Journal.

Of these seven skeletons, five are referable to the *Mias Rambi* of Sir J. Brooke; although one of them (a small but full grown female) is marked by himself *M. Pappan*; and another is sent by the new name *M. Chapin*, which is also that of an old female animal, remarkable for its extraordinarily large and vertically elongated orbits. It is probable that this alleged *Chapin* merely represents an individual variation; and Sir J. Brooke states, in his letter announcing the presentation, that some of these skeletons had been labelled by him with the names specified by natives, who, accordingly (as may be supposed in such a case), are not particularly conversant with the osteological distinctions of the different species.

The sixth skeleton is that of an old female of the *Mias Pappan*, with double-crested skull like that of the *male* figured in illustration of my former memoir. It even exceeds that male in size, but the skull is smaller; and the sexual distinctions of the two are unmistakeable. In this female, the epiphyses of the limb-bones, *scapulae*, *ilia*, &c. are thoroughly ankylosed, denoting completion of growth; even the *sympysis pubis* is united (with much irregular deposition of bone externally), and the sacro-iliac symphysis on the right side only. In no other of our Orang skeletons are the

* Wathen, J. A. S. B. VI.

two latter symphyses united. Our male *Pappan* had not quite completed his growth; for some of the epiphyses are loose, and others are but partially soldered: those of the *humeri* are fixed and semi-anchylosed; as are also those of the left *radius* and *ulna*; but the epiphyses of the right *radius* and *ulna* are detached; those of the *scapulae* and *ilia* are fixed but slightly, and those of the *ischia* more extensively. This animal had therefore (as will be attempted to be shown presently) not completed its full growth: the female being much more advanced in age, with its teeth proportionally worn down. On comparison of the skulls of the two sexes, that of the female is seen to be smaller, with the maxillæ less protruded, increasing the facial angle from 32° to 35° ; the zygomatic arch is much less robust; and the longitudinal grinding surface of the upper molars less by $\frac{3}{16}$ in., while that of the lower molars is less by $\frac{1}{4}$ in. than in the youthful male presented by Mr. Nicholls, and by $\frac{7}{16}$ in. than in Dr. Clarke Abel's Sumatran male. In the form of the ascending ramus of the lower jaw, this female specimen more nearly resembles the Sumatran male referred to than any other of our numerous specimens; but the condyle is considerably larger; and, as compared with Mr. Nicholl's Bornean male, the antero-posterior diameter of the ascending angle is much less; being in the Bornean male (on a level with the surface of the grinders) $2\frac{5}{8}$ in.,—in Abel's Sumatran male but $2\frac{1}{4}$ in.,—and in Sir J. Brooke's Bornean female $2\frac{1}{2}$ in. Lastly, this Bornean female presents the very extraordinary anomaly (throughout the series of placental mammalia) of a fourth true molar above and below, though on the left side only: that of the upper jaw being of small size and round form, its crown scarcely exceeding that of an upper false molar of *MACACUS RHESUS*; and it is placed posteriorly to the ordinary last true molar on a line with its outer surface, that tooth having been pressed a little inward: in the lower jaw the accessory fourth true molar is very little smaller than the normal molars; and it projects from the internal margin of the anterior surface of the ascending angle of the jaw, its crown being directed obliquely inwards much more than forwards or upwards: as a functional tooth, it must, therefore, have been almost useless; though the outer or upper margin of its crown is a little worn down by attri-

tion, as is also the outer cusp of the small accessory molar above. This old female Pappan had been badly wounded in its day ; having had its left humerus severely fractured, and the fibula of that side also broken ; the fractured bones having healed ; the unset humerus, however, in an extraordinary manner, exhibiting two large and deep perforations in the great lumpy mass of united bone, where suppuration had ensued, and large shot had probably been ultimately discharged from the orifices.

The seventh skeleton is that of a species altogether distinct and new ! Although that of a large old male, with the cranial sutures much obliterated, and the ankylosis of the epiphyses of its limb-bones complete, it is very remarkable for the comparatively slight protrusion of the jaws, and the consequently increased facial angle ; apparently, however, to a greater extent than really, from the flatness of the face, the unusually slight protrusion of the sockets of the upper incisors, and, above all, the elevation of the condyle of the lower jaw raising so considerably the occipital portion of the skull and consequently the auditory orifice. The facial angle does not actually exceed $32\frac{1}{2}$ ° ; while in the two *Rambis* (male and female) figured in my former memoir, it is as low as 30°—(this being also Prof. Owen's estimate of his adult skulls of the *Rambi*). The *zygomata* (or cheek-bones) are unusually prominent. The canines, incisors, and the first three upper molars on each side, are exceedingly much worn down by attrition ; the canines even to a level with the other teeth : but the circumference of these canines, especially in the lower jaw, is conspicuously less than in males and even large females of the *Rambi* and *Pappan* ; though they are proportionally larger than in the *Kassar*. It is further remarkable that the frontal ridges of the skull, instead of uniting upon the vertex to form a single sagittal crest (as in the *Rambi*), or continuing separate and well apart throughout (as in the *Pappan*), approach to contact upon the vertex but without uniting ; which is very likely to prove a constant and specifical distinction, as the present old male shews much irregular deposition of bone externally to its contiguously double sagittal crest. The long bones of the limbs, though fully as stout as in the *Rambi* and *Pappan*, and about twice as stout as those of our old female *Kassar*, yet probably do not exceed the

corresponding bones of the full grown male *Kassar* in length; being very much shorter than those of the adult *Rambi* and *Pappan*: and this remarkable brevity of limb, combined with the conspicuous differences in the skull and sundry other distinctions, can scarcely be considered otherwise than as indicative of specifical peculiarity.

Of the five *Rambis* sent, there is unfortunately no specimen of a male of the largest size, comparable to that of which the skull is figured in the 1st and 2nd plates accompanying my former memoir: but there are two large full-grown females (including that ticketed *Mias Chapin*), and also a full grown female of smaller dimensions (which was labelled *M. Pappan*,) with a male of superior age and stature to the male *Pappan* presented formerly by Mr. Nicholls; and also a young male, with the last molars brought into wear, but which nevertheless had not nearly attained its full growth, which bade fair to rival that of the gigantic Sumatran male already noticed.

The specimen to which the name *Mias Chapin* was attached, appears (as already mentioned) to be a large old female *Rambi*, very remarkable for the enormous size and vertically elongated form of its orbital cavities, which measure 2 in. by nearly $1\frac{3}{4}$ in. across. Its skull is larger, though less massive, than that of the female *Rambi* figured in my former memoir: the muzzle is conspicuously more slender, measuring but $2\frac{5}{8}$ in. in greatest width (outside the canines), instead of $2\frac{7}{8}$ in.: and whereas the coronoid process of the lower jaw in the former specimen is smaller and about on a level with the condyle, in the present example (labelled *Chapin*) the posterior or condyle process is unusually prolonged, and raises the skull (with lower jaw *in situ*) so remarkably, that placing it on a level surface together with the other skull noticed, the zygoma of the so-called *Chapin* not only overlaps that of the other, but its lower edge is about $\frac{1}{16}$ in. higher than the upper edge of the *zygoma* of the other specimen.* the nasal bones, which in the other are united and ascend to the very summit of the *glabella*, in this skull continue separate, and reach only to the lower portion of the *glabella*. This skeleton is very deficient, wanting the *sacrum* and most of the bones of the hands and feet: but all of the long bones are present, with

* In Prof. Owen's figure of a female *Rambi* skull (*Zool. Trans.* I, pl. 35), the condyle-process is similarly elongated.

the shoulder-blades and rest of the *pelvis*; the epiphyses being completely soldered. The limb-bones are even rather longer than in the great female *Pappan*, and in fact exceed in length those of any other of our full-grown specimens: the *humerus* measuring 15 in.; the *ulna* (to tip of styloid process) $15\frac{1}{4}$ in.; femur $11\frac{1}{2}$ in.; and tibia $10\frac{1}{2}$ in.: circumference of middle of trunk of humerus $3\frac{1}{4}$ in.; and of femur $2\frac{7}{8}$ in. The few digital bones seem to accord in dimensions with the corresponding bones of our male *Pappan*. The extreme length of the *scapula* is $8\frac{7}{8}$ in.; and of *pelvis* $10\frac{7}{8}$ in.: clavicle 8 in. This specimen is marked as having been procured in Sadong (in Borneo).

The next specimen, which was erroneously marked *Pappan*, we consider to be a small female *Rambi*, though fully mature and even old, as shewn by the almost complete obliteration of the cranial sutures, the ankylosis of the various epiphyses, and the amount of attrition of all the teeth. The cranial ridges are very small; and the sagittal crest is hardly at all raised, but nevertheless exhibits a tendency to rise along the median line of the skull, between the frontal ridges which converge from the temples, and to be prolonged in front, anterior to the convergance of the latter, which takes place unusually far back: the nasal bones are united and singularly minute, actually not rising so high as the wide part of the orbital cavities; and the latter are small and circular, measuring barely $1\frac{2}{3}$ in. every way. The skull considerably resembles that of the female *Rambi* formerly figured, only that the sagittal crest is so much smaller; the *zygomata* being also more raised (in consequence of the greater prolongation of the condyle process of the lower jaw); and the orbits are smaller and more circular, and surmounted by much slighter ridges: consequently the face is flatter, and the sockets of the incisors are also less protruded. The skeleton is unfortunately very imperfect, wanting most of the bones of the hands and feet, and one *tibia* and *fibula*: a portion of the lower jaw, with the canine, first *præ-molar*, and part of the second, is also lost: but the other long bones are present, and the *pelvis* is complete. Length of *humerus* but $13\frac{1}{2}$ in.; of *ulna* $13\frac{7}{8}$ in.; of *femur* $10\frac{7}{8}$ in.; and of *tibia* 9 in.: circumference of middle of *humerus* $2\frac{7}{8}$ in.; and of *femur* $2\frac{3}{4}$ in.: metacarpal bone of middle finger $3\frac{1}{8}$ in.; metatarsal of

corresponding toe $3\frac{3}{4}$ in.: *os calcis* 2 in. Total length of scapula (with acromion) $1\frac{1}{2}$ in.; and of pelvis $9\frac{7}{8}$ in.: extreme breadth apart of the *ilia* (or hips) $10\frac{7}{8}$ in.: clavicle $6\frac{1}{2}$ in. This specimen also is marked from Sadong in Borneo.

The third female *Rambi* is of large size and fully mature, with the various epiphyses well soldered: but it has even less trace of sagittal crest than the last; the frontal ridges meeting as far back upon the skull, but not quite uniting, and a small mesial ridge rising between them above the vertex: the orbits are moderately large and a little elongated vertically, measuring $1\frac{5}{8}$ by $1\frac{1}{2}$ in.; and the nasal bones are united and ascend a little into the glabella. Size about that of the first specimen (marked *Chapin*), but the muzzle rather broader or $2\frac{11}{16}$ in. This specimen is nearly perfect: but the face is disfigured by a bullet which had knocked away the inner half of the right orbit and a tolerably large piece from the occiput; which fragments are lost. Length of *humerus* $14\frac{3}{4}$ in.; *ulna* $15\frac{1}{4}$ in.; *femur* $11\frac{5}{8}$ in.; *tibia* $10\frac{1}{2}$ in.: circumference of middle of trunk of *humerus* 3 in.; and of femur $2\frac{3}{4}$ in.: metacarpal bone of second or middle figure $4\frac{5}{16}$ in.; first phalanx of ditto $3\frac{1}{16}$ in.; second phalanx $1\frac{1}{16}$ in.: metacarpal bone of thumb $2\frac{1}{8}$ in.; first phalanx of ditto $1\frac{13}{16}$ in.: metatarsal bone of middle toe $3\frac{3}{16}$ in.; first phalanx of ditto $3\frac{1}{8}$ in.; second phalanx $1\frac{3}{4}$ in.: metatarsal bone of hallux $2\frac{1}{16}$ in.; first phalanx of ditto $1\frac{3}{16}$ in.; and unguinal (!) $\frac{1}{16}$ in. Total length of *scapula* $9\frac{1}{2}$ in.; *clavicle* $7\frac{5}{8}$ in.; extreme length of *pelvis* $11\frac{1}{4}$ in.; and extreme breadth of *ilia* 12 in.

The two remaining *Rambis* are males: and the first to be noticed is a young animal, whose skull had obviously not attained its full dimensions, though the last true molars had been brought into wear: but the general massiveness of this skull indicates that the animal would probably have become a male of the largest size: the sagittal crest had begun to rise on a grand scale; and the frontal ridges converge directly to it, although these are scarcely indicated for $\frac{3}{4}$ in. before their junction. The teeth are more crowded than in the full grown animal; the inter-space between the upper canine and outer incisor, which in our large Sumatran male is $\frac{4}{3}$ in., being scarcely $\frac{1}{4}$ in.; and the first false molar, instead of being completely posterior to the canine, advances considerably on its outer surface

posteriorly: in the lower jaw, also, there is a bony inter-space between the canine and first false molar in the large mature male, but not in the adolescent male: nasals partially ankylosed, and continued upward to the lower part of the *glabella*: epiphyses of the *humeri* considerably ankylosed, and also those of the *tibiae* and *fibulae*; but not of the *radii* and *ulnae*. This skeleton also is tolerably complete. Length of *humerus* $14\frac{3}{8}$ in.; of *ulna* $13\frac{3}{4}$ in.; of *femur* 10 in.; and of *tibia* 9 in.: circumference of middle of trunk of *humerus* $2\frac{15}{16}$ in., and of *femur* $2\frac{1}{4}$ in.: metacarpal bone of middle finger (the epiphyses beginning to ankylose) $3\frac{1}{4}$ in.; first phalanx of ditto $2\frac{7}{8}$ in.; second phalanx $1\frac{7}{16}$ in.: metacarpal of thumb $1\frac{7}{8}$ in.: metatarsal of middle toe $3\frac{1}{8}$ in.; first phalanx of ditto $2\frac{3}{4}$ in.; second $1\frac{5}{8}$ in.: metatarsal of hallux $1\frac{7}{8}$ in. Clavicle $6\frac{1}{2}$ in. Extreme length of *scapula* (minus epiphysis) $7\frac{1}{2}$ in.: of *pelvis* (with ischial but not iliar epiphysis) $9\frac{3}{4}$ in.; and extreme breadth at the hips $10\frac{1}{2}$ in.

The next is a mature male, but certainly not of the largest dimensions: being about the size of the great females already described; and not otherwise recognisable from them than by the general massiveness of the skull (which is remarked at the first glance), and less conspicuously than usual in the present instance, by the form of the *pelvis*. The superciliary ridges are much broader than in any female skull; and the *zygomata* equally robust: the sagittal crest is also broad and well developed: nasals distinct, and reaching up to the lower part of the *glabella*. Skeleton tolerably complete; wanting most of the unguinal phalanges and some other small bones. Length of *humerus* $14\frac{3}{4}$ in.; of *ulna* (with loose epiphysis) $15\frac{1}{8}$ in.; of *femur* $11\frac{1}{2}$ in.; *tibia* $9\frac{7}{8}$ in.: circumference of middle of trunk of *humerus* $3\frac{1}{2}$ in.; and of *femur* $2\frac{3}{4}$ in.: metacarpal bone of middle finger $4\frac{1}{4}$ in.; first phalanx of ditto $3\frac{1}{16}$ in.; second phalanx $1\frac{11}{16}$ in.: metacarpal of thumb $1\frac{3}{16}$ in.; first phalanx $1\frac{1}{2}$ in.: metatarsal of middle toe $4\frac{1}{8}$ in.; first phalanx of ditto $2\frac{15}{16}$ in.; second phalanx $1\frac{11}{16}$ in.: metatarsal of hallux $2\frac{1}{16}$ in.: clavicle $7\frac{1}{4}$ in.: scapula $8\frac{3}{8}$ in.: pelvis $10\frac{3}{4}$ in. in extreme length, and $11\frac{3}{4}$ in. broad at the hips. This specimen was marked *Mias Rambi* by Sir J. Brooke; and is also from Sadong in Borneo: the three skeletons received from Sadong having unfortunately been prepared by interment in the

ground; and the present being the most complete of them and otherwise the least injured.

We now come to the female *Pappan* already noticed; which, though of greater size than the male described on a former occasion, with considerably longer and broader *pelvis*, has nevertheless a smaller skull, less prominently developed jaws, and conspicuously smaller teeth: the zygomatic arch is shorter and a little weaker than in the male; but the superciliary ridges and width of the bony orbits are much the same, and in fact there is little further difference between the two skulls: the bony crests on the vertex are less prominent in the female, and they approach to within $\frac{1}{2}$ in. of each other; whereas in the male they remain 1 in. apart where most approximated: length of base of skull, from between the middle incisors to the anterior margin of the occipital foramen, $6\frac{7}{8}$ in. in the male, and $6\frac{1}{2}$ in. in the female: breadth of *zygomata* apart $6\frac{5}{8}$ in. in both. This skeleton is also nearly perfect. Length of *humerus* 15 in.; of *ulna* $15\frac{5}{8}$ in.; *femur* $11\frac{1}{2}$ in.: *tibia* $10\frac{3}{8}$ in.: circumference of middle of trunk of *humerus* $3\frac{1}{4}$ in.; of *femur* 3 in.: metacarpal bone of middle finger $4\frac{1}{8}$ in.; first phalanx $3\frac{1}{8}$ in.; second $1\frac{1}{8}$ in.: metacarpal bone of one thumb 2 in., of the other somewhat less, and bearing a very short first phalanx, only $\frac{7}{8}$ in.; metatarsal bone of middle toe 4 in.; first phalanx 3 in.; second $1\frac{3}{8}$ in.: metatarsal of hallux $2\frac{1}{8}$ in.: clavicle $7\frac{1}{4}$ in.: *scapula* $8\frac{1}{2}$ in. in extreme length: and *pelvis* $10\frac{5}{8}$ in. long, and $11\frac{1}{4}$ in. broad at the hips.

Lastly, we arrive at the new species, which may be designated **PITHECUS CURTUS**. It is perhaps the genuine *Mias Chapin* of the Dyaks. The specimen is decidedly male, and well advanced in years; and the skull has a more anthropoid appearance than that of any other Orang known. This chiefly results from the much reduced prolongation of the muzzle, while the cheek-bones project remarkably, giving a sort of Kalmuk expression to the skull! The absolute projection of the maxilla, in a horizontal line carried from the lower margin of the orbital ring, is, in our large Sumatran male *Rambi* skull, fully 3 in.; in the male *Pappan* it is about the same; in the female *Pappan* $2\frac{1}{2}$ in.; in the old female *Kassar* (a much smaller animal) about $2\frac{1}{4}$ in.; and in the great male *CURTUS* barely 2 in.! Extreme breadth of *zygomata* 7 in.: height of the skull, with lower

jaw *in situ*, 11 in.: length, in a straight line, from the summit of orbital cavity to between the incisors, $4\frac{1}{2}$ in. (the same measurement being in the male *Rambi* $5\frac{1}{8}$ in., and in the male *Pappan* $4\frac{5}{8}$ in.): length from occipital foramen to base of upper incisors 6 in. (in the male *Rambi* $7\frac{1}{8}$ in., and male *Pappan* $6\frac{7}{8}$ in.): length of bony palate 3 in. (in the others $3\frac{7}{8}$ in., and $3\frac{5}{8}$ in.): orbital cavities $1\frac{5}{8}$ by $1\frac{1}{2}$ in. across: extreme width of bony orbits apart externally 5 in.: extreme breadth of ascending ramus of lower jaw $3\frac{7}{8}$ in.; height of the condyle $4\frac{3}{8}$ in.; length of grinding surface of the upper molars $2\frac{1}{16}$ in. The skeleton is fortunately nearly perfect. Extreme length of *humerus* $13\frac{1}{4}$ in.; *ulna* $14\frac{3}{16}$ in.; *femur* $10\frac{3}{16}$ in.; *tibia* $9\frac{3}{8}$ in.: circumference of middle of trunk of *humerus* $3\frac{1}{4}$ in.; of *femur* $2\frac{7}{8}$ in. (length and circumference of *humerus* of old female *Kassar* $12\frac{3}{4}$ and $2\frac{1}{4}$ in.; ditto of *femur* $9\frac{7}{8}$ in. and $2\frac{1}{2}$ in.): length of metacarpal bone of middle finger $3\frac{7}{8}$ in.; first phalanx of ditto $2\frac{15}{16}$ in.; second $1\frac{15}{16}$ in.; metacarpal bone of thumb $2\frac{1}{16}$ in.; first phalanx $1\frac{1}{8}$ in.; metatarsal bone of middle toe $3\frac{11}{16}$ in.; first phalanx $2\frac{3}{4}$ in.; second $1\frac{5}{8}$ in.; metatarsal bone of *hallux* 2 in.; clavicle $6\frac{7}{8}$ in.: extreme length of *scapula* $8\frac{3}{4}$ in.: of *pelvis* $10\frac{1}{8}$ in.; and breadth at the hips 11 in. Length of the vertebral column, from atlas to *sacrum*, measured internally, $16\frac{1}{4}$ in.; in the scarcely full grown male *Pappan*, $17\frac{1}{2}$ in., and in the old female *Kassar*, $15\frac{1}{4}$ in.: *axis*-vertebra soldered to the next. As compared with the *Rambi* and *Pappan*, the metacarpals and metatarsals are shorter, and the first phalanges of the fingers and toes are longer.*

* A friend who has resided long in Borneo, and has examined numerous skulls of Orang-utans (including those which have passed through the hands of Sir J. Brooke), informs me that he has remarked that, in the adult and aged specimens of the *Rambi* and *Pappan*, the canines are always perfect; whereas in those of the small *Kassar* they are as regularly broken or worn down to about a level with the incisors. This remark is borne out by the series of skulls now under examination. The canines are long and unbroken in all the specimens of the *Rambi* and *Pappan*; and are ground down in the old female *Kassar*, and also in the old male *P. CURTUS*! Denoting probably a difference of food. Moreover, the same gentleman informs me that different species of these animals do not appear to inhabit the same district; and he thinks that the *P. OWENII* represents, in the southern part of the great island, the *P. MORIO* of the northern part.

With the grand series of skulls and skeletons of adult Orang-utans now subjected to examination, amounting to twelve in all (*viz.* 3 males and 4 females of *PITHECUS BROOKEI* or *Mias Rambi*, 1 male and 1 old female of *P. SATYRUS* or *M. Pappan*, one old male of the *P. CURTUS* or *M. Chapin?*, an old female of the *P. MORIO* or *M. Kassar*, and the adolescent female with short fore-arms, provisionally designated *P. OWENII*,—in addition to Prof. Owen's excellent lithographs of the male *Kassar* and of male and female *Rambi* in the *Trans. Zool. Soc.*, Vols. I and II), the observer is first struck with the very obvious and conspicuous distinctness of the comparatively puny *Mias Kassar*, and of the adolescent small skeleton, from all the rest. The next glance suffices to separate the *Rambi*, *Pappan*, and *P. CURTUS*: the last being quite as thoroughly distinguished apart by the *tout ensemble* of its appearance, as the *Pappan* is by its conspicuously double-crested vertex. I should think that no zoologist, accustomed to the discrimination of specifical characters, would hesitate, with the present series of skulls before him, to acknowledge the distinctness of each of these three; but such an observer would ponder for awhile over the remarkable female *Rambi* skull with enormous and vertically oblong orbits, and would doubtless hesitate in regarding it as specifically identical with the old female *Rambi* of small size; so great is the contrast between them. Presuming, however, that he arrived at the conclusion here ventured upon, it still follows that the *Rambi* is subject to an extraordinary amount of variation for a wild animal; and this, although it may not invalidate the opinion of its distinctness from the *Pappan* and *P. CURTUS*, nevertheless prompts a reconsideration of the grounds for the view formerly expressed, with regard to the specifical distinctness of the small specimen having short fore-arms. From the detached state of the epiphyses of its limb-bones, it is certain that that specimen was not full-grown; and as those of the *ulnae* at least (as shewn by the skeleton of the adult male *Rambi*, and also by that of the male *Pappan*,) are the last to become ankylosed, it should follow that the fore-arm continues to increase in length after the upper arm and the leg had ceased to grow: but the difference is still too great to be thus accounted for satisfactorily: and upon re-comparison of this specimen with the undoubtedly aged female *Kassar*, I deem it

prudent to await the further evidence which Sir J. Brooke has kindly promised that he would endeavour to procure and send, before venturing to confirm or modify my previously expressed opinion on the subject.

This fact would appear certain, that the partial ankylosis of the epiphyses of the limb-bones does not rigorously denote cessation of growth: unless the female Orangs attain to greater stature than the males, which is most unlikely. It would seem rather, that as the earthy salts are continuously absorbed and re-deposited, some continuance of extension supervenes, until finally checked and stopped by the considerably increased deposition of bone. The skull also continues long to increase in size, after the last true molars have been brought into use.

As regards the sexual distinction, a practised eye discerns it readily in the adult skull, by its superior general massiveness in the male; and, in the skeleton, the larger and broader *pelvis* of course denotes the female animal, combined with a proportionally smaller and less robust skull than in the other sex. There is no reason to doubt the correct determination of sex in any one of the specimens here noticed.

The occasional but rare occurrence of the unguinal phalanx to the *hallux* or great toe, would seem to be proper to no particular sex or species; for it exists in our male *Pappan* from Sumatra, and in our female *Rambi* from Borneo.

It now remains to connect the osteological with the external characters of the different species; to determine the stature attained by the largest males of the *Rambi*, *Pappan*, and also *Kassar*, to obtain further information of the *PITHECUS CURTUS*, and to verify or otherwise the *P. OWENII*. With the powerful aid of the accomplished Raja of Sarawak, we trust to be enabled ere long to resolve these various problems.

Indian Oology.—By W. THEOBALD, *Junr. Esq., Calcutta, October, 1855.*—(Continued from Vol. xxiii, p. 603).

1	<i>Milvus atter</i> ,	Calcutta, October 4th, 3.	O. P.	Greenish-white, spotted and blotched with pale reddish brown : nest of sticks, bulky,	
		2.21			
		<u>1.68</u>	Pure white.		
2	<i>Gyps bengalensis</i> ,near Deoghur, November 4th, 1.	O. P.	Nest of sticks, usually small for the size of the bird, and placed at the top of cotton trees or others, very difficult to ascend.		
		3.20			
		<u>2.52</u>	Pure white.		
3	<i>Buceros cayanus</i> ,Tenasserim, February 3rd, ...	1. O. P.	In holes of trees, in which the female is built in with mud by the male, as observed by Capt. Tickell (p. 279, ante).		
	For the measurement of an egg, I am indebted to Capt. Tickell, who was fortunate enough to observe	2.63			
		<u>1.88</u>			
4	<i>Buceros subruficollis</i> ,Tenasserim, February 3rd, ...	3. O. P.	Pure white.		
		2.20	Mode of incubation said to be similar to the last.		
		<u>1.55</u>			
5	<i>Haloion smyrnensis</i> ,Mergui, March 4th, ...	5. B. O.	Pure white.		
		1.20	Gallery $1\frac{1}{2}$ feet in a stiff bank, near a road.		
		<u>1.03</u>			
6	<i>Haloion gurial</i> ,Monghyr, June 4th, ...	4. R.	Pure white.		
		1.09	Gallery 1 foot in a stiff bank in jungle.		
		<u>1.02</u>			

7	<i>Merops erythrocephalus</i> , Mergui, March 3rd, ...	5.6 B. O.	Pure white.	
		0.84	Galleried from 1 to 7 feet in length, in soft sandy soil near water. It enters the ground at a small angle and then runs horizontally.	
8	<i>Eudynamys orientalis</i> , Monghyr, June 3rd, ...	1. O. P.	Pale dirty green, much blotched with reddish brown. I had but one egg brought, and the man reported four crow's eggs in the same nest.	
		1.20		
		0.90		
9	<i>Centropus rufipennis</i> , Monghyr, June, ...	4. O. P.	Pure white : nest placed in dense trees, a neat but loose structure of twigs domed, and with aperture in the side lined with dried leaves.	
		1.30		
		1.09		
		1.47		
		August,...		
				1.21
10	<i>Cypselus affinis</i> , Monghyr, May, June,...	4. O. P.	Pure white : nest described in a former paper. Mr. Layard, however, describes it as building a <i>mud</i> nest in Ceylon (vide Annals for 1853, page 311).	
		0.90		
		0.56		
11	<i>Cypselus balasiensis</i> , Monghyr, June 3rd, ...	3. L. P.	Pure white : nest of vegetable down, with a few feathers agglutinated with mucus to the frond of the Borassus.	
		0.80		
		0.45		
		Prome, July,...		

- 12 *Corvus culminatus*, ... Tenasserim, February 3rd, ... O. P. Dull sap-green, much blotched with brown.
 1.66

- Near Deoghur, March 4th, ... 1.15 Nest carefully placed in tall trees.
- 13 *Aerodotheres tristis*, Monghyr, June 1st, ... 5. O. P. Pale green.
 1.20 Nest in trees or holes in houses,
 of grass and rubbish.
 A
 Prono, July 3rd, (2nd brood) 0.85
- 14 *Sturnus contra*, Monghyr, May 3rd, ... 5. O. P. Clear pale green.
 1.10 Nest of grass and twigs in trees.
 June 3rd, ...
 Tavoy, April 1st, ... 0.82
- 15 *Malacocercus bengalensis*, ... Monghyr, June 2nd, ... 5. B. O. P. Deep bluish green.
 "Fat-gobria," "Gogni," 1.00 Nest of twigs and fibres in bushes.

 0.79
- 16 *Malacocercus caudatus*, ... Monghyr, June, July, ... 4.5 O. P. Nest and eggs, previously described.
 O. P.
- 17 *Neornis flavolivacea*, Darjiling, July 2nd, ... 3. B. O. P. Deep dull claret red, with a darker band at broad end.
 0.69 Nest, a deep cup, outside of bamboo leaves, inside fine vegetable fibres,
 0.55 lined with feathers.

18	<i>Orthotomus longicauda</i> , ...Dorjiling, August 4th,...	4. O. P.	3.4	Greenish-white, dotted with pale reddish.
	Tavoy, May 1st,...	0.61 0.45	0.45	Nest, a neat cup of fibre and vegetable down, enclosed in a single leaf, which is secured by stitches of fibre; so as to envelope its entrance at the top and beneath the stalk, the leaf serving as an admirable pent-roof to the nest.
				.
19	<i>Thamnobia cambaiensis</i> , ...Monghyr, April 2nd,...	3.4	Greenish-white, ringed and spotted with pale reddish, with some spots of neutral.	
	June 3rd,...	O. P. 0.64	0.64	Nest rude, in holes, in trees and banks, of grass and nearly always snake-skin.
20	<i>Hirundo domicola</i> ,Tenasserim, April 2nd,...	3. L. O. P.	3.77 0.52	White, spotted and ringed with umber. Nest a saucer of mud, inner part coarse roots, profusely lined with feathers and vegetable down, attached to the under part of "snags" projecting some 4 feet above the water.
21	<i>Hirundo simensis</i> ,Salween R., January 2nd...	4. O. P.	0.62 0.48	Pure white. Nest of grass and lined with feathers.

22 *Pyenonotus haemorrhous*,Monghyr, June 4th, ... 3. O. P. Nest and eggs like *P. bengalensis*, previously described ; eggs not quite so highly coloured.

0.90

0.68

23 *Nectarinia flammavillaris*, ...Tavoy, February 1st, ... 2. O. P. Pale greenish, speckled with greyish ash. Nest, a neat purse, in a lime tree (*Citrus*), like *N. asiatica*.

0.56

0.43

▲ 2

24 *Macropygia leptogrammica*, ...Darjiling, July 2nd, 0.—(1 ?) Dirty white : nest, a few sticks.

1.40

0.98

25 *Francolinus sinensis* (var. *Phayrei*), ...Burmah, June 4th, (Miadeh), ... 4. R. P. Uniform greenish-cream ; on the ground.

1.40

1.15

26 *Turnix occellatus*,Monghyr, June 1st, ... 4. R. P. Yellowish-grey, closely freckled with dark yellowish grey, blotched with deep reddishumber with a few dots of neutral : on ground.

0.88

0.74

27	<i>Glareola lactea</i> ,Tenasserim, March 3rd, ...	B. P. (3?)	.....Dusty buff, ringed and spotted with obscure neutral, and irregularly lined with yellowish brown. On churs and river sand-banks.
		1.01	
		<hr/>	
28	<i>Edicnemus crepitans</i> ,Deoghur, April 1st, ... ("Nonari," "Ptilis.")	2. O. P.	.....Pale stone-colour or yellowish cream, blotched with deep red brown.
		1.80	
		<hr/>	
		1.35	On ground in sal jungle.
29	<i>Hoplopterus ventralis</i> , ...Tenasserim, March 3rd, ...	3. P.	.....Yellowish stone-colour or creamy nankeen, regularly spotted with deep red brown and sparingly blotched with neutral.
		1.60	
		<hr/>	
		1.17	On sand-banks in the river.
30	<i>Metopodius indicus</i> ,Monghyr, August, ...	L. O. P.	.....Clear brownish-ochre, strongly lined and streaked with black,—nest of weeds in jheels.
		1.50	
		<hr/>	
		0.97	
31	<i>Hydrophasianus chirurgus</i> , ...Monglyr, August 2nd, ...	4. P.	.....Clear brownish or greenish bronze : nest, weeds in jheels.
		1.33	
		<hr/>	
		1.10	
32	<i>Ciconia lencocephala</i> ,Deoghur, June 4th, ... ("Jhangil,"	3. P. O.	Dull white : nest of sticks placed in tall trees, usually "simul," most difficult to ascend.
		2.50	
		<hr/>	
		1.90	"

33	<i>Herodias intermedia</i> , ...Monghyr, July 1st, 2nd, ...	6. O. P.	Full green.
		1.76	Nest small, of sticks; in company with "Mainas" and Nos. 34 and 35.
		1.26	
		1.94	
		1.30	
34	<i>Herodias garzetta</i> ,Monghyr, July 1st, ...	6. O. P.	Full green, nest as above—No. 33.
		1.45	
		1.11	
		1.14	
		1.58	
35	<i>Herodias bubulcus</i> ,Monghyr, June 1st, ...	6. 8. P. O.	Very pale green or greenish-white.
		1.80	Nest as above—No. 33.
		1.39	
36	<i>Forzana phoenicura</i> ,Monghyr, August 1st, ...	7. I. O. P.	Dark brownish-cream, much spotted and blotched with brownish-red. Nest of weeds in jheels.
		1.70	
		1.10	
37	<i>Gallinula Burnesii</i> ,Salt Range, August 4th, ... (previously described as <i>Gallinula chloropus</i>),	1.62	Pinkish cream or grey, spotted and ringed with deep red brown. Nest of weeds in jheels.
		1.15	

38 *Dendrocygna awstreee*, ... Monghyr, August 1st, ... 8. O. P. Creamy white: nest of weeds in jheeds.

1.81
1.50

39 *Nettapus coromandelianus*, Monghyr, August 1st, ... O. Pure white, shell very thin.

1.47
1.10

(Note.—The nomenclature used above is derived from the valuable catalogue of birds in the Museum of the Asiatic Society, by Mr. Blyth; a work of great labour, which reflects the utmost credit on its author.)

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR AUGUST, 1855.

At an ordinary general meeting of the Society held on the 1st inst. at the usual hour,

Sir J. W. COLVILLE, Kt. President, in the chair.

The President introduced to the meeting the Rev. Dr. Anderson of the American Oriental Society.

The minutes of the last month's proceedings were read.

Mr. Houstoun called the attention of the chairman to certain entries which he thought were incorrect. The chairman explained that they were generally correct but added the words: "The question was put and carried." The proceedings were then confirmed; when Mr. Houstoun handed in the following protest:—

"I protest against the above as a most incorrect and improper statement."

Presentations were received—

1. From Lt. Harris, one of a trove of 400 copper coins found whilst excavating earth for embankment purposes near Tankpanee, in the Púri district.

2. From the Secretary to the Board of Revenue, specimens of minerals, earths and gold dust sent down by Col. Hanney from Upper Assam.

3. From the Imperial Academy of Bordeaux, through Messrs. Gillander, Arbuthnot & Co., two Nos. of its Proceedings for 1854.

4. From H. B. Maddocks, Esq. Deputy Commissioner, Battala, a trove of copper coins found at Gurudáspur.

Lt. R. Stewart, 22nd N. I., duly proposed and seconded at the last meeting, was balloted for and elected an ordinary member.

In accordance with the reference made at the last meeting the Council submitted the following report on the motion of Mr. Houstoun to the effect that he may be permitted to have access to all papers, the property of the Society.

"The Council reports that the papers, which are the property of the Society, are :

"1st. The Journal Books which contain a record of the proceedings of the Society, of the Council, and of the different Sub-Committees or Sections.

"2nd. The Minutes recorded by the members of the Council or the Sub-Committees and Sections upon questions circulated for decision or consideration.

"3rd. All the correspondence of the Society filed, including copies of the letters written by the Secretary in answer to communications to him, and all the accounts of the receipts and expenditure of the Society, and reports addressed either to the Society or to the Council or Sub-Committees.

"4th. MSS. of papers published and intended to be published in the Journal and not returned to the authors.

"The rules are silent except as to the 1st class. The 101st rule expresses only that every ordinary member may have access, at such times as the Library is open, to the Journal Books of the Society and of the Council. The Council are of opinion that this rule fairly construed, includes also the records of the proceedings of the Committees.

"The Council are further of opinion that every ordinary member ought also to have access to the documents of the 3rd and 4th classes; but that the minutes of members of the Council or of Committees ought not to be inspected as of course; but only on application to the Council for their production, subject to an appeal to a general meeting of the Society, should the Council decline to sanction their production.

"The final decision on every question determined in circulation should be entered in the Journal Books."

Mr. Houstoun stated that after he had seen the above report in the printed proceedings, he would state his further views.

Mr. Houstoun presented for the Society's archives on behalf of Mr.

Charles R. Prinsep, two papers found amongst the papers of the late James Prinsep. The one a letter dated Dacca, 16th April, 1838, from L. R. Stacy to the late James Prinsep, on a sculpture, commemorative of Buddhist ascendancy, purchased near Muttra; the other paper was on the birth of Buddha by J. Low, and revised by him in Province Wellesley, in July, 1837; both papers being understood to be the manuscripts of communications published by the Society.

Mr. Houstoun stated he had a great number of other papers which he proposed similarly presenting to the Society, as soon as the labours of other members, now engaged on them, enabled him to do so.

Mr. Houstoun brought to notice and presented to the Society a copy of a paper by Mr. H. T. Prinsep, proposing the publication, by the two principal Pandits of the late J. Prinsep, in a work as particularized in the paper; all the inscriptions of Asia already published or remaining to be published by the Asiatic Society or elsewhere as far as obtainable, and gave notice that he would at the next meeting move:

1. To be informed if the original paper was with the Society, and if so, that it be produced and published in memory of the high services and eminent attainments of the late J. Prinsep and in compliment to his family, and as a step towards obtaining the co-operation of the public to Mr. H. T. Prinsep's object, as many parties would gladly aid in that object; and he further called for the production of any traces there might be of any such paper, if the original were not with the Society or to be found, as his copy appeared to have been taken from an unrevised draft; and asked for a statement of the step that had been taken in consequence of, or any way appertaining to, the object of that paper, and also proposed that the particular aid he would specify and every aid, inducement and encouragement, be given to the only surviving one of the two pandits to undertake such a work, and to any one else if that party cannot now undertake it.

2. For the production of all Mr. Heatly's unpublished contributions towards the development of the mineral resources of India, and a list of all unpublished MSS. in the Society's possession, and

that the whole of all such manuscripts be made accessible to the members during the hours prescribed for the attendance of the Librarian and other servants of the Society.

3. To ask what had been done in consequence of an intimation he understood to have been circulated some years ago amongst the members of the Society, regarding the publication of fresh maps of the Soonderbunds, and for the production of all papers given in by any one on that subject.

4. That all duplicates or supposed duplicate fossil and other remains in the Society's possession be offered to the Hon'ble the Court of Directors for their disposal, he understanding the Hon'ble Court to have expressed a wish for such, and at the same time to be informed who is individually responsible that proper measures are taken for the proper preservation of the fossil and other remains in the Society's possession, considering a joint responsibility, no security at all that such remains will be properly taken care of, constant complaints being made that the Society's property is not cared for as it should be.

5. That the whole of the fossil and other remains be placed under the sole charge and responsibility of the Curator of Economic Geology, as appertaining to his Department, and the Curator be called upon to report, after consultation with competent parties, what measures he would require to be taken to secure the proper preservation of the whole of those relics, and, especially, what is considered the best coating for preserving them, and fossil shells and bones, and teeth of mammalia, and whether a coating with a mucilage of gum tragacanth is not the best and a sufficient means of preserving such relics, if they are first saturated with it.

Communications were received—

1. From Dr. Wright, enclosing the following particulars of a luminous appearance of the sea in Lat. $11^{\circ} 27'$; Long. $105^{\circ} 40'$ E. observed on Thursday the 27th of July, 1854.

Hong Kong, June 6th, 1855.

To the Secretary of the Asiatic Society.

DEAR SIR,—A short time since, I had an opportunity of examining some Nos. of your Journal and find (Journ. No. II. 1854 p. 206,) that you solicit farther notices of such phenomena as Capt. Bowen has given

you on the preceding page. Accordingly I send you the following copy of notes taken immediately after witnessing the phenomena they describe.

Ship "Shooting Star" bound from N. Y. to Hong Kong. Thursday, July 27th, 1854. Lat. $11^{\circ} 27' N.$; Long. $105^{\circ} 40' E.$

$7\frac{3}{4}$ p. m. A little cloudy on the horizon, but very clear, bright star-light, fresh breeze. Air 73° F. Ship entered light colored water, and in about 15 minutes, the sea as far as the eye could reach, appeared like an immense field of snow, no ripples, but smooth like oil, so that when the ship's bows threw up a ripple it immediately fell back to its former level. Orders were given to heave the lead, when 60 fathoms found no bottom. The light from the water illuminated objects on deck and dimmed all stars within 20° of the horizon. Looking over the widest part of it, the horizon appeared like a dim Aurora Borealis. Ship's head North. Sailed 13 miles through this patch, then $\frac{1}{2}$ a mile through ordinary colored sea-water, and again through another patch of 10 miles of light water: limits of light water, well defined.

Dipped up deck a tub full of this water, and found it $78\frac{1}{2}^{\circ}$, same as water in the morning. The tub presented a brilliant sight, being filled with bright self-luminous serpentine animaleculæ, varying from half an inch to five inches in length. Examined carefully in the hand, by the light, they were found to be nearly transparent, about the size of a hair in the middle, and tapering a little towards each end; of a jelly-like substance which burnt in the candle with a red light, and crisped like burnt whalebone. A few were differently formed. Two were found capable of propelling themselves through still water in a tumbler. One of these was in the form of a concentric ring half an inch in diameter, with teeth-like projections on the inner edge, and seemed to propel itself by contracting the diameter of the ring: it was preserved alive about 36 hours.

This examination satisfied me that the light is emitted by animaleculæ, but I am most anxious to know if scientific men can explain *why* it appears at *certain times* and within such *prescribed limits*.

Your's truly,

A. R. WRIGHT,

Surgeon, P. and O. Co's.

S. S. "LADY MARY WOOD."

2. From Mr. Secretary Melville, India House, stating that the Hon'ble the Court of Directors have acceded to the Society's request for a set of casts of Indian Fossils in the India House Museum, and

directed Dr. Horsefield to prepare and forward the same to the Society's Agents in London.

3. From E. Thomas, Esq. forwarding a paper entitled "On the Epoch of the Gupta King."

4. From Bábu Rádhánáth Sikdár, enclosing abstracts of Meteorological Registers kept at the Surveyor General's Office, Calcutta, for the month of April last.

The Librarian submitted his usual monthly report.

Captain Thuillier then, on the invitation of the Chairman, explained to the meeting what had led to the Mission of the brothers Schlagintweit to the Himalayas—reading extracts from letters recently received from Mr. Adolphe Schlagintweit and showing the route by which he and his brother Robert had reached Milney in North Kemaon.

Confirmed 5th September, 1855.

R. G. GHOSE, V. P.

LIBRARY.

The following additions have been made to the Library since the last meeting.

Presented.

Die Lieder des Hafis. Persisch mit dem Commentaire des Sudi, Herausgegeben von H. Brockhaus. 1 en bandes 1 es heft.—BY THE EDITOR.

Natuurkundig Tijdschrift voor Nederlandsch Indie, Deels VIII. et VI. aflevering I. et II.—BY THE EDITOR.

Papers regarding the cultivation of Hemp in India, *Agra*, 1855, 8vo pamphlet.—BY THE GOVERNMENT OF THE NORTH WESTERN PROVINCES.

Selections from the Records of the Government of the North Western Provinces, No. XX.—BY THE SAME.

Selections from the Public Correspondence of the Punjab Administration, No. XI. 4 copies.—BY THE CHIEF COMMISSIONER.

Selections from the Records of the Madras Government, No. V.—BY THE GOVERNMENT.

Selections from the Records of the Bengal Government, No. XX.—BY THE GOVERNMENT OF BENGAL.

Report on the Administration of the Salt Department of the Revenue of Bengal, for the year 1853-4.—BY THE SAME.

The Journal of the Indian Archipelago, from Oct. 1854 to March, 1855, 2 copies each.—BY THE SAME.

The Oriental Christian Spectator, for May and June, 1855.—BY THE EDITOR.

The Oriental Baptist, No. 102.—BY THE EDITOR.

The Calcutta Christian Observer, for June, 1855.—BY THE EDITORS.

Zeitschrift der Deutschen morgenländischen Gesellschaft IX. Band II. Heft.—BY THE EDITOR.

The Upadeshak, No. 102.—BY THE EDITOR.

Bibidhártha Sangraha, No. 36.—BY THE EDITOR.

Recueil des Actes de l'Academie imperiale des Sciences de Bordeaux, Nos. 1-2 of 1854.—BY THE ACADEMY.

The Durbeen, a Persian newspaper, for June and July, 1855.—BY THE EDITOR.

Exchanged.

The Calcutta Review, for July, 1855.

The Athenæum, for April and May, 1855.

Journal Asiatique, October, 1855.

Journal of the Agri-Horticultural Society of India, p. 1. Vol. IX,
The Philosophical Magazine and Journal of Science, March and May,
1855.

Purchased.

The North American Review, No. 167.

The Westminster Review, No. XIV.

The Quarterly Review. No. for April, 1855.

The Edinburgh Review. No. for April, 1855.

The Annals and Magazine of Natural History, Nos. 87-88.

The Literary Gazette, Nos. 1981 @ 1999.

Revue des Deaux Mondes, 1er Mai, 1855.

L'Athenæum Français, 5 Mai, 1855.

Kaivalyanvanita, A Vedanta Poem : the Tamil Text with a Translation or Glossary, and Grammatical Notes ; to which is added, an Outline of Tamil Grammar, with specimens of Tamil structure, and comparative Tables of the Flexional system in other Dravida languages, by C. Græul, London, 1853, 8vo.

Journal des Savants, Fevr. Mars. et April, 1855.

Comptes Rendus, Nos. 3—18 except 14.

The Mahábhárata translated into Bengali by Kásirám Dásá, Purnachan-drodaya Press, 1 vol. 8vo.

The Sabdámbudhi, a Bengali Dictionary, 1 vol. 8vo.

Addy's Anglo-Bengali Dictionary, 1 vol. 8vo.

— Translation of the Arabian Nights, 1 vol.

The Shah-nameh, translated into Bengali by Bisweswar Datta, 1 vol. 8vo,
Baidyanáth Banerjea's History of Hindustan, in Bengali 1 vol. 8vo.

The Chaitanya Chandrodaya Nátak, in Bengali, 1 vol.

Panjábétihásá, or a History of the Punjab, in Bengali 1 vol. 8vo.

Shyámácharan's Bengali Grammar, in Bengali 1 vol. 8vo.

Rákhdás Háldar's History of Ráma, in Bengali 12mo.

Macaulay's Life of Lord Clive, translated into Bengali, by Hurchunder Dutt, 1 vol. 12mo.

Manatattwasára, or Combe's Principles of Phrenology, in Bengali 12mo.
Encyclopædia Bengalensis, 12 vols. 12mo.

A Narrative of the Persecution of the Christians in Madagascar with details of the escape of the six Christian Refugees now in England. By J. J. Freeman and D. Johns, *London*, 1840, 12mo.

Journal of a March from Delhi to Peshawar, and from thence to Cabul with the Mission of Lt.-Col. Sir C. M. Wade. By Lt. W. Barr. *London*, 1844, 12mo.

Narrative of a Mission to Bokhara in the years 1843-45, to ascertain the fate of Colonel Stoddard and Capt. Conolly. By the Rev. J. Wolff, *London*, 1844, 8vo. 2 vols.

Journal of an Embassy from the Governor-General of India to the Courts of Siam and Cochin China, exhibiting a view of the actual state of those kingdoms; by John Crawford. Second Ed. *London*, 1830, 8vo 2 vols.

Travels in Circassia, Krim, Tartary, &c. including a steam voyage down the Danube from Vienna to Constantinople, and round the Black Sea. By E. Spencer. Third Ed. *London*, 1839, 2 vols. 8vo.

Travels and Researches in Asia Minor, Mesopotamia, Chaldea and Armenia, by W. F. Ainsworth, *London*, 1842, 2 vols. post 8vo.

The History of Bahawolpur with notices of Sindh, Afghanistan, Multan, and the West of India, by Shahámet Ali. *London*, 1843, post 8vo.

Voyages of the Dutch Brig of War 'Dourga,' through the southern and little-known parts of the Moluccan Archipelago, and along the previously unknown South Coast of the New Guinea, performed during the years 1825-26, by D. H. Kolff, Junr. Translated from the Dutch by G. W. Earl. *London*, 1840, 8vo.

Memoir of the Countries about the Caspian and Aral seas, illustrative of the Late Expedition against Khiah. Translated from the German of C. Temmermann, by Capt. Morier. *London*, 1840, 8vo.

Personal observations on Sindh, the Manners and Customs of its Inhabitants and its Productive Capabilities. By T. Postans. *London*, 1843, 8vo.

Western India : Reports addressed to the Chambers' of Commerce of Manchester, Liverpool, Blackburn and Glasgow, by N. A. Mackey. Edited by J. Robertson, Esq. *London*, 1853, 8vo.

Travels in Luristan and Arabistan, by Baron C. A. de Bode. *London*, 1845, 2 vols. 8vo.

Narrative of a Whaling Voyage round the Globe, from the year 1833 to 1836, comprising sketches of Polynesia, California, the Indian Archipelago. &c., by F. O. Bennett, *London*, 1840, 2 vols. 8vo.

RA'JENDRALA'L MITTRA.

27th July, 1855.

FOR SEPTEMBER, 1855.

At the usual monthly general meeting of the Society held on the 5th instant, at half-past 8 p. m.

BÁBU RÁMGOPÁL GHÓSE, Vice-President, in the chair.

The proceedings of the last meeting were read and confirmed.

Presentations were received—

1. From Bábu Rámchandra Mittra, Secretary Bethune Society. Selections from the Bethune Society's Papers, Nos. I. II.
2. From Bábu Rádhánáth Sikdár, Masik Patriká, Nos. 10. to 12.
3. From J. Bedford, Esq. Geological specimens from the copper mines and Geysers of New Zealand.
4. From Capt. C. B. Young, 1st, Specimen of a New Zealand caterpillar, 2nd, Specimen of Kauri gum from New Zealand, and 3rd, the orbiculare bone of a whale's ear.

The following are extracts from Capt. Young's letter and the notes therein alluded to :

"I send you what, I believe, may be new to the Society, and if put on the table at our meeting may elicit some remarks and serve to interest, viz.: a specimen of the grass-tree caterpillar from Australia, whose conversion into woody substance is very curious. It is mentioned by Hooker; a few lines on the subject accompany, which were written by the gentleman who brought the specimen, Mr. F. M. Hind, B. C. S.

"I also send a specimen of the Kauri gum with a few remarks

from the same gentleman. This is doubtless nothing new, but its mode of formation and collection, which I have also heard of from other visitors to Australia, is interesting and peculiar.

"Lastly, what the Society may perhaps not have in their Museum the bone of a whale's ear picked up at the Cape."

"The caterpillar known as the grass-tree caterpillar burrows, at one portion of its existence, in the Pūriri tree, and it is there supposed to contract a disease or rather to become inoculated with the seed of a peculiar grass, which eventually grows out of its head. The animal lives for a time, during which it is supposed that its animal substance is absorbed by the plant, and replaced by another substance identical with the plant itself; when this process has advanced to a certain stage the animal dies, but the process of absorption of animal matter and replacement of vegetable continue until the entire caterpillar has been converted into a ligneous substance. All caterpillars are not so diseased, in fact, those specimens found with the grass growing out of them are exceptions. I have always understood that these are dug out of the ground.

"One or two specimens of the cricket-genus have also been discovered so diseased—but they are very rare.

"The grass-tree caterpillar is only found in certain localities of New Zealand."

"The Kauri gum is found under ground and marks the site of a departed Kauri tree. I have found large lumps of the gum in plains far distant from any forest; and it is generally supposed that places where the gum is found have been forests destroyed by fire. I presume it is the action of the fire which drives the sap of the tree towards the roots, and forms it into the hard substance known as Kauri gum. The wood of the tree burns readily, and time would soon obliterate all signs of the conflagration.

"I have never seen Kauri gum in a living tree."

5. From Dr. Thompson, on behalf of self and Dr. Hooker, a copy of *Flora Indica*, Vol. I.

Recorded a note from Bābu Kissory Chand Mittra, communicating his wish to withdraw from the Society.

Mr. Houstoun did not make the motion of which he gave notice at the last meeting.

The chairman announced to the meeting that Mr. Grote had resigned his post as Secretary to the Society, and that the Council have permitted Mr. H. V. Bayley a member of their body, to hold the office temporarily till the 1st October, unless a successor can be appointed before.

The chairman then, adverting, in some detail, to the valuable services rendered to the Society by Mr. Grote, proposed "that this meeting receive with regret the resignation of Mr. Grote as Secretary of the Society and Editor of the Journal, and that it desires to record its grateful sense of the distinguished zeal and ability with which he has so long discharged the arduous duties of his office."

The resolution was seconded by Mr. Allen.

Capt. Thuillier proposed as an amendment:

"That this meeting have learned with great regret of the sudden determination of Mr. Grote to resign the appointment of Secretary to this Society, and request that he be solicited to waive that determination, and to continue the benefit of his valuable services to the Society."

The Hon'ble F. Drummond seconded the amendment.

Dr. Thompson moved "that the resolution be postponed till the next meeting, in order, that the papers connected with Mr. Grote's resignation may be laid before the Society to enable them to come to a decision in a matter so deeply to be regretted."

On being put to the vote Dr. Thompson's proposition was lost and the first amendment carried.

Communications were received—

1. From the Secretary to the Government of the North-Western Provinces, enclosing copy of a Meteorological Register kept at the Office of the Secretary at Agra, for the months of June and July last.
2. From G. R. Freeling, Esq. submitting an Index to all the numismatic papers published in the Journal of the Society.
3. From Bábu Rádhánáth Sikdár, forwarding abstracts of Meteorological Observations taken at the Surveyor General's Office, in the months of May and June last.

The Librarian submitted his usual monthly report of additions made to the library during the month of July last.

On the conclusion of the regular business of the evening, Mr. Houstoun handed in the following protest:

"I protest against the assumption of the chair by the Chairman on the grounds of his being a Vice-President of the Society, having already protested that no Council has been elected."

Confirmed 3rd Oct. 1855.

RAMGOPAUL GHOSE, V. P.

LIBRARY.

The library has received the following valuable accession to its stores since the last meeting.

Presented.

Memorie della Reale Accademia delle Scienze di Torino, I series, vols. 1 to 6 and 12 to 40, and ii. series, vols. 1 to 12 (2 copies of the last) and 14.—*BY THE ROYAL ACADEMY OF TURIN.*

Ramayana poema Indiano di Valmici testo sanscrito secondo i codici manoscritti della scuola Gaudana per Gaspere Gorresio. Parigi, 1844 to 1853, 8 vols.—*BY THE SAME.*

Fisica de' corpi Ponderabili ossia trattato della constituzione generale de' corpi del cavaliere Amedeo Avogadro. Torino, 1837, 4 vols. 8vo.—*BY THE SAME.*

Melanges de Philosophie et de Mathematique de la Société royale de Turin. Turin, 1759-73, 5 vols. demi 4to.—*BY THE SAME.*

Museo Numismatico Lavy appartenente alla Reale Accademia delle Scienze di Torino. Torino, 1840, 2 vols. 4to.—*BY THE SAME.*

Flora Sordoa seu Historia Plantarum in Sardinia et Adjacentibus insulis vel sponte nascentium vel ad Utilitatem latius excultarum auctore J. H. Moris. Taurini, 1837, 3 vols. 4to.

Analyse grammaticale Raissonnée de differens textes anciens Egyptiens par F. Salvolini, vol. I. Paris, 1836, 8vo.—*BY THE SAME.*

Essai d'un Parallèle entre les Forces physique et les Forces morales par H. Carena. Turin, 1817, 8vo.—*BY THE SAME.*

Dizionario Militare Italiano di G. Grassi. Torino, 1817, 2 vols. 8vo.—*BY THE SAME.*

Rapporto e Observazione interno alla cura dei Fancielli Cretini. Torino, 1854, 4to.—*BY THE SAME.*

Elementi di Storia naturale Generale di Eugenio Sismonda. Torino, 1853, 12mo.—*BY THE AUTHOR.*

Notizia Storica dei Savori fatte dalla classe di Scienze Fissiche e Mathematique nel Corso degli' anno 49 et 53 par E. Sismonda. Torino, 1851-53, 4to.—*BY THE AUTHOR.*

Osteografia di un Mastodonte augustidente illustrato del E. Sismonda. Torino, 1851, 4to.—*BY THE AUTHOR.*

Natuurkundig Tijdschrift voor Nederlandsch Indië. Deel, IV. Nos. III, IV.—BY THE EDITORS.

Selections from the Records of the Madras Government, No. IX. Reports on Important Public Works, for 1851.—BY THE BENGAL GOVERNMENT.

Selections from the Records of the Government of Bengal, No. XIII. Correspondence relating to Suppression of Dacoity in Bengal.—BY THE SAME.

The Calcutta Christian Observer, for August, 1855.—BY THE EDITORS.

Address at the Anniversary Meeting of the Royal Geographical Society, 22nd May, 1844. By the Earl of Ellesmere.—BY THE SOCIETY.

Proceedings of the Royal Society, No. 13.—BY THE SOCIETY.

Journal Asiatique, No. 19.—BY THE SOCIETE' ASIATIQUE.

The Oriental Christian Spectator, for July, 1853.—BY THE EDITOR.

Flora Indica, being a Systematic Account of the Plants of British India, together with Observations on the structure and affinities of their Natural Orders and Genera, by J. D. Hooker and J. T. Thompson, vol. I. London, 1855, 8vo.

Exchanged.

The London, Edinburgh and Dublin Philosophical Magazine, No. 61, June, 1853.

Athæneum, for May 1855.

Purchased.

Annals des Sciences naturelles. Paris, 1855, Tome III. No. 1.

Revue et Magazin de Zoologie par G. Meneville, No. 4.

Annals and Magazine of Natural History, No. 90.

Journal des Savants, for May, 1855.

Comptes Rendus, Nos. 19 to 23.

Bulletin archæologique de l'Athenæum français, Nos. 1, 4 and 5.

L'Athenæum français, Nos. 1, 6, 10, 11, 12, 13, 15, 16, 17, 19, 20, 21, 22 and 23.

The Literary Gazette, 2000, 1, 2 and 3.

Zendavesta or the Religious Books of the Zoroastrians, edited and interpreted by N. L. Westergard, vol I. p. iv.

Memoirs of the Life, Writings and Correspondence of Sir William Jones, by the Hon'ble Lord Teignmouth, with the Life of Lord Teignmouth. Selections from Sir William Jones's works, and occasional notes, by the Rev. J. C. Wilks, London, 1835, 2 vols. 12mo.

1st Sept. 1855.

RA'JENDEALA'L MITTRA.

JOURNAL
OF THE
ASIATIC SOCIETY.

No. VII.—1856.

Ancient Indian Numerals.—By EDWARD THOMAS, Esq. B. C. S.

I have reserved for independent examination, the letters or figures inscribed on the *obverse* field of the Peacock coins. The readers of the Journal of the Asiatic Society of Bengal may call to mind, that Jas. Prinsep, in the number for April 1838, first introduced a notice on “the Sanscrit Numerals,” which, up to that period, he had succeeded in discovering on coins, Inscriptions, &c.

His prefatory remarks are so apposite and so essential to a due understanding of the subject as it then stood, that I need make no apology for reproducing them in this place. “The most ancient mode of denoting number in the Sanscrit languages, as in the Greek and Latin, was by the use of letters in alphabetical order. This system we find prevalent in all ancient Sanskrit works, as well as in the Pálí, the Tibetan and other derivate systems. There do not appear to be any numerals peculiar to the Pálí. In their sacred records, the words are always written at length; they have also the symbolical words of the Sanskrit astronomical works, and what is called the *Varna-sankhyá* or numerical classification of the alphabet. The numerals now employed in Ceylon, Ava, Cambodia, Siam, have hardly the slightest affinity to one another.”

“When this system was exchanged for that of the decimal or cipher notation does not appear to be known, or to have been

investigated by the learned.* Up to the 9th or 10th century of our era, the Nágari numerals extant on numerous monuments do not differ materially from those now in use.”†

Jas. Prinsep then goes on to narrate the circumstances under which he came to detect the values of certain numerical symbols, which were repeated after the *written* date on three several inscribed copper-plates from Gúzerát. The various totals were supplied as follows 394—380—15—385.

He imagined therefore, that he had obtained the figures representing the numbers 1, 3, 4, 5, 8 and, 9, and pursuing his enquiry, he was able to collect no less than fifteen or sixteen separate forms. This in itself suggested a difficulty, for if these numerals were ciphers, capable of acquiring local value, the five or six extra figures were clearly superfluous. Prinsep evidently felt this, and though he suggested that the surplus numbers might be merely varieties of the normal types, yet with his accustomed candour, he admitted, “ It is further to be remarked that in many of the ancient systems, separate symbols were used to denote ten, twenty, &c. in combination with the nine units severally. The curious compound figure seemingly used for the 1 of 15, in the two cases quoted above,  may be of this sort:

—indeed it somewhat resembles the Ceylonese ten.”‡

Following out this latter view of the question, in 1848, I succeeded in demonstrating that these signs were uniformly independent symbolical numerals, each denoting in itself a given number, irrespective of any relative collocation;§ and therefore, that the 

was equivalent to 300, wherever it might be found, and likewise that the  and  stood for 80 and 90 respectively, whatever position they might chance to occupy. I then proceeded to distinguish those symbols of the Sáh coin dates, that declared themselves severally units, tens or hundreds by their fixed place in the order of which,

* Dr. Stevenson considers that “ our decimal notation” is “ a comparatively modern invention of the Scindian merchants of the middle ages.” J. R. As. Soc. Bombay, iv.

† J. A. S. B. VII. 348.

‡ J. A. S. B. VII. 353.

§ J. R. A. S. XII. 33.

value was always fitly maintained, notwithstanding that the figures themselves clearly could not change their signification by any relative re-arrangement. Beyond this, I cannot claim to have advanced the enquiry in any essential degree. The important aid, that otherwise might have served me, in the sequent classification of the numbers—the test of their recurrence on the coins of the Sáh Kings—was altogether wanting in the fact, that the order of succession of those princes was in itself undetermined.

A re-examination of the entire subject is therefore sufficiently called for, and it is possible that the new data, which have lately become available, may contribute materially to solve the general problem of the system under which the ancient Indian Scheme of notation was primarily conceived.

Prior to entering upon details and as strictly introductory to the present enquiry, it is necessary to examine the progress of numerical notation in the Semitic alphabet of the language of Northern India.* The Bactrian Pali of Asoka's time is seen to have been

* M. Reinaud's Mémoire sur l'Inde was published after the appearance of my Essay in 1848. I therefore transcribe the information contributed by that work towards the general subject. "Albyrouny a consacré un passage de son Traité sur l'Inde aux chiffres employés de son temps, chez les Indians, avec une valeur de position. Ces chiffres sont appelés par nous *Chiffres Arabes*, et les Arabes les nomment *chiffres indiens*. Albyrouny s'exprime ainsi : Les Indians, à la différence de nous, ne se servent pas des lettres de leur alphabet pour indiquer des nombres. Mais, de même que l'alphabet varie suivant les provinces, les chiffres changent aussi ; les indigénés les nomment *anka* انک! Les chiffres dont nous faisons usage sont empruntés à ce que l'on a trouvé de plus convenable chez eux.

"Du reste, les formes sont indifférentes, pourvu qu'on s'entende de part et d'autre. Dans le Cachemire, on ne se sert pas de traits particuliers pour exprimer les nombres, ou a adopté les signes employés par les Chinois. Mais un point sur lequel tous les Indians sont d'accord, c'est de procéder d'après la système décimal."

** M. Reinaud continues. "Arrêtons nous un moment sur les paroles d'Albyrouny :" Les Indians, a-t-il dit, ne se servent pas des lettres de leur alphabet pour exprimer des nombres. "Il existe un traité Sanscrit, composé par Aryabhatta, dans les premiers siècles de notre ère ; et dans ce traité, comme cela se pratiquait chez les Grecs, les Juifs, et plus tard chez les Arabes, les nombres sont exprimés par les lettres de l'alphabet ayant une valeur numérale* Apparemment, le procédé em-

* Voy. un mémoire de feu M. Whish, intitulé, *On the alphabetical notation of the Hindus* (*Transactions of the Literary Society of Madras, London, 1827*).

deficient in any symbols, either literal or figured, capable of represented by Aryabhatta était tombé en désuétude au temps d'Albyrounny. Neanmoins, les traités scientifiques composés par Brahma-Gupta, au VII. siècle de notre ère, et par les écrevains postérieurs, ne supposent pas, en général, l'usage des chiffres; les nombres sont exprimés par des mots susceptible d'être rattachés à une quantité quelconque. Albyrounny ajoute qu'on ne pouvait se livrer à la lecture des traités consacrés à l'astronomie, si l'on ne s'était d'abord rendu un compte exact de cette manière de compter." ** M. Reinaud sums up his inferences to the following effect, " Il semblerait résulter de l'emploi des lettres, de l'alphabet par Aryabhatta, pour exprimer les nombres, que dans les premiers siècles de notre ère, les Indiens mêmes, en employant ces lettres avec une valeur de position, n'avaient pas encore eu l'idée de recourir à des signes particuliers. A l'égard de la méthode mise en usage par Brahma-Gupta, elle s'explique suffisamment, d'un côté par l'habitude où les indigènes ont été de tout temps de faire mystère de leur savoir; de l'autre, parce que des mots significatifs s'incorporent mieux dans un vers que des chiffres."

While examining the general subject, it may be useful to glance at the Phoenician system of numerical notation. M. Judas in his erudite treatise on La Langue Phénicienne (*Paris, 1847*) remarks, " La Bible et les monnaies asmonéennes nous montrent les nombres exprimés chez les Hébreu tantôt par les noms appellatifs, tantôt par des simple lettres. Ainsi, pour nous en tenir aux monnaies dont le style a plus de rapport avec celui des monuments que nous étudions, nous y trouvons l'an *un* indiqué par **ת נ נ ת נ ש**, ou seulement par **נ**, l'an *deux* par **ז ו**, pour

TKHA TNS

A

B S

ז ש נ ה, l'an *quatre* par **צ ש נ ה א ר ב ו ש**. Nous verons ce double système suivi aussi
B TNS EBRA TNS

par les Phéniciens dans leurs inscriptions lapidaires. Mais pour les monnaies ils avaient des signes particuliers, idéographiques, entièrement analogues à nos chiffres." Our Author then goes on to state that the units up to nine were expressed by simple perpendicular lines (precisely such as recur in the Kapurdigiri Inscription) repeated to complete the requisite numbers. The ten was represented by a plain horizontal stroke, twenty and thirty were formed severally by a duplication or triplication of this sign, the forty was figured by a symbol approximating to a cinde N of our Italian type, and like the *ten* was repeated to form higher numbers. There was a special cipher for the *hundred* composed of a small circle placed between two perpendicular lines, thus **|○|**. This number was also capable of being rendered alphabetically by **מָאֵה** for **מָאֵה** "one hundred," or by its

TAM HAM

abbreviations **מָה** or **מָ**. After commenting on this system, M. Judas con-

AM M

tinues, " Nous avons vu dans quelques unes des formules numérales examinées pre-

senting numbers.* In the Kapurdigiri rock inscription the *four* kings are spoken of as “*chaturo rajano*,” with the insertion of *four* cédemment des lettres substituées aux chiffres. Ce procédé, commun à la plupart des langues anciennes, va se montrer exclusivement employé dans quelques inscriptions lapidaires. Dans d’ autres, les nombres sont rendus par leur noms entiers. Dans une enfin, le nombre est exprimé en partie par un nom appellatif, en partie par une lettre remplissant le rôle de chiffre,” p. 90.

In conclusion I may advert to the high antiquity of this monetary system of Phoenician notation, as exemplified in its use on the Assyrian weights of the 9th or 10th century B. C., where its figures are found inscribed on the bronze lions, discovered by Mr. Layard, and expressed both in words and figures thus—

ה מ ש א ע ש ר מ נ ה=fifteen manahs

HNM RSY ASM KH

and again on the same weight.

י י י י י — ה ה ה =15 manahs

HNH

J. R. A. S. XVI. 215.

“Mr. Norris on Assyrian and Babylonian weights.”

It is further to be remarked that the Phoenician, like our Indian, system, indulged in a variety of forms for the same numeral. M. Judas continues, “Les exemples C. et D. nous offrent des signes numéraux de formes différentes de celles des chiffres précédemment déterminés. Nous n’ avons aucune donnée pour fixes avec certitude la valeur de ces signes. Cependant l’ explication de Gesenius réunit assez de probabilités pour q’ on l’ adopte. Selon lui, le cercle de l’ exemple C. emprunté aux médailles d’ Acc serait, comme la forme autorise à le croire, li *ain* initial du mot ש ר י י ת *vingt*, de même que, dans l’ exemple B. 3, *cent* est exprimé par le mem *mershy*

initial du mot מ נ ו. Le demi-cercle qui suit sur l’ exemple C. 2, et qui reparait
t a m

sur les exemples D., serait la moitié du nombre noté par le cercle entier, savoir *dix*. Les signes H. II. A. des exemples D. sont d’ autres variantes du chiffre *vingt*. Cette valeur est évidente pour le premier, qui, sur la médaille D., table 36, VI. se trouve placé entre les vingtaines et la dizaine ; il ne peut pas faire le nombre intermédiaire car, ainsi que le demande Gesenius, comment croire que, n’ ayant pas de chiffre particulier pour *cinq*, les Phéniciens en auraient formé un pour rendre *quinze*? En fin, suivant l’ illustre paléographe, II serait une alteration de ce même signe H ; A une alteration du signe N.

* It is true, as I formerly remarked, that this position may have to be somewhat qualified, inasmuch as up to this time we are able to cite only the early number *four*; and it is possible that the higher numerical equivalents may, in the necessity of the case, have been subjected to a more perfect system, as is seen to have

perpendicular strokes between the two words, to fix definitively the written number.”* Major Cunningham claims to have discovered—on the authority of “a stone slab, which gives, in regular order, the nine numerals†—that the numerical signs of this language were expressed by the initial letters of “their Pushtu names written in Ariano-Pali.” How soon after Asoka’s time this system was introduced is not stated, but Major Cunningham considers that he has obtained direct evidence of its local use from 144 B. C. to 31 B. C. and he proceeds to add, with reference to these literal figures, “the first four are given in two distinct forms * * and the two forms show in the clearest manner how the straight horizontal strokes of Asoka’s, and even later, days, gradually became the 1, 2, 3 of India, from whence they were transmitted through the Arabs to Europe.”‡

I now arrive at the most important elucidation that this subject has received since Jas. Prinsep’s original discovery, in the “Observations on the dates found in the cave inscriptions at NASIK” by the

occurred in the Cuneiform Inscriptions, where the low numbers were often defined by little more than rude combinations of the equivalent number of simple strokes, while the decimals and hundreds were far less crudely rendered. Rawlinson, J. R. A. S., No. X. p. 172; Hincks, *idem*, XVIII. 423.

* J. R. A. S. XII. 42.

† J. R. A. S. XII. 225.

‡ J. A. S. B. 1854, p. 703. I must confess that I regard this theory with some suspicion ; in the first instance it implies, in effect, the use of a second language in the body of an inscription, the bulk of which is expressed in another tongue ; it is admitted that even the limited number of the unit numerals will not stand the Pushtu test, that the initial for *four* must still be taken from the *chaturo* as it occurs in Asoka’s Kapurdigiri inscription ; and that the signs for 1, 2, 3 must be traced to other sources.

Next, we have to concede that this Arian character which was soon to be superseded by the more exactly expressive Indian Páli, was enabled either at the time of its own eclipse, or at some subsequent period—to associate its literal numerals with the southern system of writing, and having thus early entered into the alphabets of the Sánscrit and certain Indian dialects, that these figures and the perfect system of notation that they represented, remained uncommunicated to India at large, till at least the end of the 4th century A. D. (Vallabhi Grant J. A. S. B. VII. 966 and Pl. XX, *ibid*), if not till a far more modern epoch.

Major Cunningham does not appear to have been sufficiently impressed with the real importance of that portion of his discovery, which determines that so early as

Rev. J. Stevenson.* Among these records are to be found no less than twenty-eight figures or combinations of figures, usually appended to the written exposition of the given value defined at length in the body of the text;† the lower numbers are sufficiently simple and

144 B. C. the Indians understood the art of the definition of sums by the sequent arrangement of the ten units, each of which acquired value from its place in the general total. His efforts seem to have been confined to the ascertainment of the limited functions of each figure or the derivation of its normal type.

Hence in noticing Dr. Stevenson's very valuable contributions to our knowledge of the subject he remarks [note p. 704 J. A. S. B. 1854] Dr. Stevenson, in *Bombay Journal*, vol. V. p. 38, found "a striking resemblance between the character denoting a thousand and the Bactrian S reversed," "and after an examination of the rest he" "thought it exceedingly probable that they were all derived from that source."

Major Cunningham thereupon proceeds to congratulate himself on the result, that "our independent deductions are the more satisfactory as they were obtained from different sources."

It is certainly singular, that while acknowledging the correctness of Dr. Stevenson's attributions and even pressing it into support of his own argument, the writer did not perceive that the very admission of the conclusiveness of the one determination necessarily compromised the other, the simple concession that a separate and independent character of the Bactrian alphabet was borrowed, as carrying that value to express the sum of one thousand, was directly opposed to the notion that the unit *literal* cypher of that system of writing were adequate to acquire value from relative position, as his published inscriptions purported to prove; if the science of numeration had advanced so far as to determine that the act of locating the unit 1 in the fourth place of a line of figures sufficed to represent *one-thousand*, what need was there of complicating the operation by the use of a special and separate cypher to define the requisite amount? It is possible that Major Cunningham understood that the adoption of Arian letters into the *Gujrat* alphabets, as exponents of given numbers, took place prior to the elaboration of the system of which he illustrates, but from the tenor of his observations it would certainly appear that he had lost sight of the difficulty above suggested.

* J. A. S. B. 1854, Note p. 407. Journ. *Bombay branch R. A. S.* July, 1853, p. 35.

† I could have desired that the facsimiles of these inscriptions should have been more calculated to command our faith in their exact rendering of the originals, but I observe that Dr. Stevenson himself does not place any very great reliance upon the transcripts, as he remarks, "I trust also to be able to compare all the published copies of the facsimiles with the inscriptions themselves, which, in respect to those at Nasik, I have been unable as yet to do, so as at least to get as

obvious, and are only perplexing in the multiplicity of forms, some of their exponents are seen to take; the larger sums on the other hand, are expressed by a crude and uncertain method, under which the amount has to be read backwards in the current line of writing; thus, the generic symbol for *thousands* is ordinarily entered first, that for *hundreds*, second, while the specific decimal or unit cipher, which determines the value of the whole, is placed last in the order followed by the rest of the inscription. At times again, the mark for *hundreds* is indifferently inserted before or after the figure which indicates the total.* If, by any possibility, further argument were required to that end—this double system of arranging the ciphers would alone establish, that they were incapable of having their value enhanced or diminished by change of place.

Dr. Stevenson's point of departure, like my own on a previous occasion, was from Jas. Prinsep's investigations of April, 1838, he does not seem to have seen my paper of 1848, and therefore expresses no opinion either for or against my position, but continues to follow Prinsep in reading ፩ as *three*, in preference to *three hundred*; at the same time that he admits, that the three horizontal lines fully suffice to express the lower number, for which indeed he has a second variant, and while his own materials contribute separate and independent signs for 10, 20, 30, and *one hundred*: the latter being specifically distinguished from the ordinary generic sign for *hundred*.

The next item I have to advert to, is the idea advanced that the Satrap numerals owe their forms to the Bactrian alphabet.† This

perfect a copy of them as can be obtained in the present state of the rocks. As the facsimiles are the property of Government and executed by another gentleman [Lt. P. F. Brett], I have done nothing more than, to the best of my ability, see that the lithographer executed his task faithfully." Bombay Journal, 1853, p. 57. And again p. 50, Dr. S. observes "it is difficult for me at present to say whether the frequent omissions of the point for ፩ and other anomalies, belong to the original, or are the faults of the facsimile."

* Nasik Inscription, No. 2, plate 7.

† Dr. Stevenson remarks "In the Satrap inscriptions, the numerals used to express the different sums of money there mentioned are peculiar. At first I could determine nothing about their origin, but on a careful examination I found a strik-

supposition I can scarcely bring myself to accede to. The conclusion is chiefly based upon the similarity traced in certain forms of the figures, to the original letters of the Arian writing; in order to carry out the comparison however, very great liberties have to be taken with the normal forms of the characters themselves, and even these rather forced identifications are confined to a very limited proportion of the entire suite of the numbers; while on the other hand many of the figures are clearly and indubitably composed of letters of the alphabet in which the inscriptions at large are expressed. That these latter in their original constitution actually were indigenous letter symbols seems to be fully established by other more recent inscriptions, where such forms are seen ordinarily to follow the progressive modification of the cognate alphabet.

I now proceed to examine the figures in detail.

To commence with the units, I conclude that no one will wish to gainsay the simple and obvious determination of $\text{—} = 1 = = 2$ or $\equiv = 3$, as suggested by me in 1848; the first mark occurs on Sáh coins,* on the Huriswámini inscription at Sanchi,† and on the Peacock coins of the Guptas, the second is found on Sáh coins,‡ and on the Udayagiri cave inscription,§ and the third is met with amid the early Páli of the Bhilsa Topes,|| on the Sáh coins,¶ and in the Chandra Gup-

ing resemblance between the character denoting a thousand (*Sahasra*) and the Bactrian 'S reversed. This induced me to examine the rest of them, and I think it exceedingly probable that they are all derived from that source. The Bactrian Tx. pronounced in Sanscrit J or Dsch, will represent well the figure, which is first in 5 or 10 (*Dasha*.) The sign for 5 (*Pancha*) is the P, or the old Indian ¶ inverted. The Bactrian double T, also approaches very nearly to the 8 of our inscriptions, as if to denote ፪. It would appear, then, that the Bactrian letters had been introduced into the Satrap Indian inscriptions as numerical cyphers. The system, also, is the ancient Roman and Greek one, that in which there are different signs for the 1 in tens, hundred and thousands; our present decimal notation being, as I have noticed elsewhere, a comparatively modern invention of the Scindian merchants of the middle ages, (J. R. A. S. Bombay IV.) Future research will probably show, as Mr. Prinsep has done with a few of them already, that the old Indain numerals are also ancient letters," (J. R. A. S. Bombay V. 39.)

* J. R. A. S. XII. 62. † J. A. S. B. VI. 458. Bhilsa Topes, Pl. XXI. No. 198.

‡ J. R. A. S. XII. 39. § Bhilsa Topes, No. 200. || Bhilsa Topes 252, No. 121.

¶ J. R. A. S. XII.—38.

ta inscription at Sanchi.* The 2 and 3, in this form likewise appear among the Nasic legends. It will be seen that the 2 and 3 are essentially the same figures that we have in use at the present day, modified merely by the cursive form given to them by the connecting semicircles, by which the necessity of removing the pen from the paper while expressing each separate stroke was avoided, and these in themselves furnish us with a singular illustration of what progressive modifications of Indian alphabets owe to the mechanism of penmanship.†

Dr. Stevenson contributes an independent form for the *one*, which he likens to the Bactrian क but which under either of its modifications, is simply and solely the compound ए pt of the alphabet, in the body of which it finds a place. He also has a new cypher for 3 in his inscription No. 5, but I am not satisfied either with the accuracy of the outline, or the low value assigned to the figure employed; as, even accepting the symbol to stand for 3, the sum total to be consistent with the associate system of notation, ought to be read as *three hundreds* and not 300,000 as given in the text.

The *four* is proved to us by the copper plate inscriptions noticed above. The form of this cipher varies considerably in its different examples, ranging from the simple चु to the most common type च्छ and extending even to the possible च्छक or च्छ of Dr. Burns No. 1, copper-plate,‡ this last reading if admissible, might be thought to ally it with the initial of च्छग, *an age*, one of the symbolical words for *four*. Certain of the Sáh coins give the outline of the symbol as a चु with two backward horizontal lines issuing, parallel to each other, from the prolonged limb of the second down-stroke of the letter, and again, singular to say, at times the subjoined letter is formed by one continuous stroke, carried round after the manner of the Gupta च, under which aspect the figure might easily have grown into the ४ of modern days.

Dr. Stevenson gives us four imperfect varieties in the outline of this number commencing with the च्छक above adverted to, passing on

* J. A. S. B. VI. 455. Bhilsa Topes, No. 197.

† Prinsep has already traced the gradual development of many of these alphabetical changes. J. A. S. B. VI. 1044.

‡ J. A. S. B. VII, Pl. XX. J. R. A. S. XII. 32.

to symbols shaped like the letters तक and की, and ending with a form like the Bactrian *ch*; but I am inclined to consider each and all of these examples as either ignorantly executed or incorrectly copied types of the standard ङ्.

The value of the cipher for *five* was also first contributed by the copper-plates, its component letters here read clearly as ना. Its numismatic equivalent appears to exist in the unit to be seen on the leaden piece, No. 29, Pl. II. J. R. A. S. XII. of which the East India Company's coin of Vijaya Sáh seems to offer another variety.* It is difficult to trace the slightest affinity between any of these forms and the modern figure of the Devanagari system. The only verbal number that would at all accord with the initial ना, would be नाग, *a serpent*, which term however is used to represent *eight*: the Nasik inscription further determines, that with these very dissimilar types, must be classed a figure offering an absolute counterpart of the ए *ru* of the Sáh alphabet, add to this, the same authority requires the admission to a joint classification, of a variant of more formal outline, which gives an additional forward head stroke such as is used to express the letter आ;† under which aspect, the sign may be compared to an English F. Dr. Stevenson exhibits, beyond all these, two other varieties of the five, the one in a reversed ए or rather of a form like the Gupta ए n,‡ while the second in a measure follows the outline of a Bactrian P, but in both these instances, I am more disposed to concur with that author in distrust of his materials, than in fanciful comparisons with the Bactrian alphabet.

The ancient Indian *six*, is given in Dr. Stevenson's plate, but with the expression of a doubt regarding the identification; the second or Satrap form, which may be read as ङ्, is seemingly entered with more confidence. I am unable to trace any numismatic figure that will satisfactorily accord with the latter.

The *seven*, under the evidence of the Nasik Inscriptions, may be indicated in the unit letter on coin 14, Pl. I. J. R. A. S. XII. which is elsewhere of frequent occurrence. The correct outline of the

* J. R. A. S. XII. 54.

† J. R. A. S. XII. p. 40, and fig. 23, Pl. I.

‡ J. R. A. S. XII. Pl. II. fig. 41.

figure is well represented by the modern Bengali ঙ. The original character assimilates somewhat with the exceptional form of ፩ of the Gupta Alphabet of Allahabad, but does not by any means approach the formation of that letter in the Sáh inscriptions, nor does it bear any likeness to the cramped ፩ on the *reverse* of the coins of the Sáh Dynasty.

A well-fashioned ancient ፩ is the symbol next in order of succession: were there any more distinct justification for attempting to explain these letter-ciphers by the symbolical terms of the Sanscrit texts, a somewhat forced construction might be put upon this figure as ፩ anka nine; but if outline similitudes have, as it would seem, a preferential claim, this figure may well demand to be considered as the early model of the ፯—8 which retains so much of its identity to this day amid the numerals of the medern Devanagarí. Dr. Stevenson has a cipher for this number—classed under the Satrap heading—which he likens to a Bactrian T. However, I cannot but observe that Lt. Brett's original copy of the text of the inscription scarcely represents the figure in such close identity as the outline entered in the Table of Numerals compiled from his facsimiles would make it.

Under the catalogue for the variants of eight, perhaps, should be reckoned the letter, not altogether unlike an old ፲ t or ፳ dh,* but the determination of this point is dependent upon the correct ascertainment of the true form of *nine*, which is but indistinctly expressed in No. I. Násik inscriptions, being fashioned, in the one instance, after the manner of an imperfect ፩, and in the second, or supplementary portion of the same inscription, as ፩ of the same character, the former of which is not far removed from the normal form of the Sawrastran ፲ t. The Sáh Coin No. 31, Pl. II. J. R. A. S. XII. seems to furnish us with the correct model of the *nine*, but I hesitate in conclusively classing all these ፲ t, ፳ dh, ፩ d and ፪ di—as the proved exponents of this number, only because I observe, that Dr. Stevenson, in his table, gives the form in an inverted direction, something after the model of a cursive Bactrian S. This outline certainly does not agree with that given in Lt. Brett's accompanying detail inscription, but the author may possibly possess other

* J. R. A. S. XII. Pl. II. fig. 31. J. A. S. B. VII. p. 354, fig. 5.

sources of knowledge from whence he may have obtained his approved outline.

The Gupta units vary somewhat from the Sáh exemplars. As yet I have only been able to discover three definite and complete forms, the $\frac{4}{\pi}$ —four above adverted to, the one which is shaped as an ordinary hyphen, and the curious figure that occurs on No. 57. Pl. II. J. R. A. S. XII. here its outline follows that of an alphabetical न; but, in treating of Gupta numbers I must fairly warn my readers of a preliminary difficulty that I have experienced in regard to the correct point from whence they should be viewed. The Nasik inscriptions display the symbol for *one hundred* as written perpendicularly, and if that is the correct direction of the cipher, our Gupta dates placed in front of the profile of the King, ought to be read Mongol fashion, like the names of the monarchs of the Gupta race, as usually expressed on the field of their gold currency. On the silver pieces of Kumára Gupta, however, whether the sign for 100 may be reversed or not, the arrangement of the tens and units clearly demonstrates that the whole must be read as consecutive rather than as superposed figures, while strange to say, the dates on Skanda Gupta and Buddha Gupta's coins seem to necessitate a contrary mode of decipherment.

I have entered the outlines of the Gupta numerals both tens and units in accordance with this somewhat arbitrary arrangement, leaving the point fairly open to correction, when more numerous and more perfect specimens of this coinage may decisively instruct us on the general question.

I have yet to advert to the outlines last on the unit line, but the single example of this sign to be found on a coin of Kumára is too imperfect to justify my quoting it with any confidence.

For the assignment of the several symbols representing the numbers from 30 to 80, we have equally but very imperfect data. The 10, 80 and 90 are established by the copper-plate duplicate dates. The 10 in a new form, the 20 and 30 are contributed by the Nasik inscription, and we have some slight aid in determining the relative priority of the various ciphers in the occurrence of two of their number on the Valabhi grants* of one, and the same cen-

* No. 1, Valabhi Grant (Wathen) J. A. S. B. IV. 481 and No. 5, Pl. XX. Vol. VII. No. 4 ditto (Burn) J. A. S. B. VII. Pl. XX. No. 4 and VII. p. 966.

tury, as well as in the Gupta coins now under review, whose register chiefly refers to the early half of their current centennial epoch.

This we may fairly infer from the distinct date of 165, given in Buddha Gupta's Eran pillar inscription; it* is of no consequence,

* I have but lately observed, that I consider, that it imports but little, as to what particular cycle the Gupta dates should be referred, so that they each and all are made to precede the fixed epoch of the commencement of the Valabhī Samvat in 318-19 A. D. I have no especial desire to retain them under the SAKA KĀL, but am fully prepared to subject them to the test of any other suitable scheme of computation. Albirūnī's expressions in regard to the Gupta era, in no wise necessitate a notion that the 241 years intervening between the conquest of Saka by the second Vikramaditya in A. D. 78, and the extermination of the Guptas in A. D. 318-19, were exclusively filled in by the domination of the latter.

Any such supposition would involve an obligation to identify some one of the early members of the Gupta family with the original Vikramaditya *Sakari* himself—which, though not altogether beyond the bounds of possibility, is still an improbable association; but taking a reasonable interval to have elapsed after the success of Vikramaditya, and assuming the rise of the Guptas to have been, as it clearly was—gradual, Chandra Gupta the second will not be badly placed by the dates on the Udayagiri and Sanchi inscriptions, when applied to the Saka kāl, which will give a return of S. S. 82 = A. D. 160, and S. S. 93 = A. D. 173.

To test the Gupta epoch by another method, which the tenor of the Buddha Gupta inscription at Sanchi recommends to our notice, in the use of the words “in the aforesaid year of his dynasty” (J. A. S. B. VII. 634)—let us assume this 165th year to be the period that had elapsed from the assumption of Suzerain honors by Chandra Gupta the *first*, and further concluding as we have fair reason to do—that the decline of the Gupta power under Buddha did not long avoid complete fulfilment, we may place approximately the period of the sway of the race at about 180 years. Now, by arranging this total anteriorly to the fixed limit of the fall of the Guptas, 318-19 A. D. we obtain the date of 138-39 for the rise of the family. Under this new view then, the Gupta dynasty may be held to have arrived at prominent power during the early half of the *second* century A. D. instead of during the second half of the first century A. D. as I had previously conjectured; thus, Major Cunningham and myself still differ on this head to the extent of nearly two centuries.

To complete the review of this section of the subject it may be as well to examine how the remaining series of figured dates, appertaining to other dynasties, will arrange themselves when tested by cycles at all suitable to their requirements.

The Sāh epoch, which the extant dates on the coins indicate to extend from, say 310 to 400, when tested by the popular Buddhist era of 477 B. C. (J. A. S. B.

in the present enquiry, as to what cycle these figures refer; it is sufficient that the same era must have been used to date both Gupta coins and Gupta inscriptions. It must be admitted that these new lights necessitate a reconstruction of the order of succession assigned to the Sáh kings, but as no great reliance has ever been claimed for the published lists, which were avowedly framed upon the most inconclusive materials, we need not hesitate in modifying any previ-

1854, p. 704) is found to range from 167 to 77 B. C. when tried by the Srí Harsha cycle of Albiruni, 457 B. C. This interval falls between 147 and 57 B. C. If the Seleucidan era be preferred, the Sáh period will have to be assigned to B. C. 2 to 88 A. D. I had before remarked, that "The claims of the Seleucidan era (1st Sept. 312 B. C.) to be considered as the cycle in use under the government of the Sáh kings, are by no means to be lightly passed over, if we bear in mind on the one hand the possible subjection to Greek supremacy implied by the superscription of that language on the local coins, and on the other, the care with which the recognition of this era was enforced in the provinces more directly subject to the Seleucidan rule, as we learn that it was "used all over the East by the Jews, Christians, and Mohammedans. The Jews still style it the *Era of Contracts*, because they were obliged, when subject to the Syro-Macedonian princes, to express it in all their contracts and civil writings," Gough, Seleu., 3. "In Maccabees, i. 10, it is called the *Era of the Kingdom of the Greeks*," Gough, 4. (J. R. A. S. XII. 41) nevertheless, I should ordinarily be disposed to give the preference to an Indian cycle.

The Vaibhavi copper-plate grant of Sri Dhara Sena, dated in *three hundred and twenty?*—when applied to the Vikramaditya Samvat of 56 B. C. gives A. D. 324; if tested by the Saka era of 79 A. D. the return will be 399 A. D., neither of these dates could be much objected to, but possibly the former will best meet the general wants of the case. Though I am free to confess that I was formerly disposed to doubt the universality of the use of the Vikramaditya era (J. R. A. S. XII. 5) my suspicions on the subject being excited on remarking the extensive prevalence of the employment of the Saka cycle, in the grants published by Elliot and Wathen of so early a date as 490 and 567 A. D. (J. R. A. S. IV. V.), yet if we are to trust to Albirúní, we must clearly yield the preference to the Vikramaditya era in the localities he indicates in the passage rendered by M. Reinaud "L'ère de Vikramaditya est employée dans les provinces méridionales et occidentales de l'Inde," regarding the Saka kál it is added "Les personnes qui se servent de l'ère de Saca, et ce sont les astronomes"—(Fragments 145). An item of negative testimony of some value towards establishing local usage, is further afforded by the insertion of the Vikramaditya and the exclusion of the Saka method of computation in *the* grant which determines *the* epoch of the Valabbis (Tod, I. 801).

ous conjectures on the subject.* As far as the limited data permit of my forming a judgment, I am inclined to assign to the several decimals the following order of priority :

1st. The crab-like symbol, the old Páli म placed horizontally, No. 6 of Prinsep's list, is now clearly proved by the Nasik inscriptions to stand for *ten*. This was somewhat unexpected, as we already were in possession of a clearly defined cipher for that amount, furnished by the Guzrát copper-plates—which it will be remembered takes the form of a double ए or ए, with the mark of a ए above the compound and the sign of the आ prolonged forwards from the foot of the upper ए. Besides this, Major Cunningham identifies a third variety of the figure in the letters फि of the Chandra Gupta inscription at Sanchi,† but even these do not exhaust our list of tens, as we have further varieties in the unfrequently employed फि of the Nasik records,‡ and from the same source we obtain a representative of ten which may possibly prove to constitute the letters यि, though the incomplete outline of its base, as copied in Lt. Brett's facsimiles, does not fully agree with the usual formation of that semivowel.

Dr. Stevenson, pursuing the Bactrian comparison, would liken this figure to a अ j, but apart from the gentle violence of having to turn the top curve the wrong way, which is needful to complete the likeness, the very marked final up-stroke of the original inscription (V. line 5) is altogether superfluous to the due expression of the Bactrian letter.

2nd. The Greek θ the Indian घ is also determined for us by the Násik monuments—wherein the figure stands proclaimed as the equivalent of *twenty*. These inscriptions further supply us with a new and independent sign for the same number, in a घ of their own alphabetical system.

* The details of this I leave for future illustration, it may be sufficient to say here that the subject has been taken into consideration in connection with the present position of the enquiry.

† J. A. S. B. VI. Pl. XXV.; Bhilsa Topes, Pl. XXI.

‡ Inscription V. line 2, Inscription VI. line 5, twice over. On the last occasion its use is peculiar, as, the 1000 instead of being defined as in line 4, by one symbol representing that amount, is expressed by *ten* hundreds.

3rd. Dr. Stevenson assigns the value of *thirty* to a cipher formed like an *e* reversed and which differs but little, from the Karnáth and Telinga figure 3.* It is possible that under the same heading will have to be entered, the symbol identical with the Tibetan *one*, shaped as the **¶** *a* of the Bactrian character, which has been placed by Prinsep first in his list.

So also perhaps will Wathen's figure (J. A. S. B. IV. 477) have to be referred to this association, unless indeed, it is preferred to look upon it as an imperfectly formed θ .

4th. The *forty*, *fifty*, *sixty* and *seventy* are purely conjectural assignments; still, there exist some imperfect hints for their relative arrangement.

The figure fashioned like a Gupta **ॐ** seems to come first in order; the sign occurs on the coins of Dama Sáh and of his son Dama jata Sriyah.† It has not as far as I am aware of, been met with in Rock inscriptions on copper-plates.

Next I would place the sign formed like a narrowed **¶**, which is found so frequently on the money of Vijaya Sáh son of Dama Sáh.‡ This symbol has not been detected in inscriptions, while the **¤** which constitutes the next figure in serial order appears only, as a solitary example, in the Huriswámini inscription at Sanchi.§ The fact of the **¤** never having been discovered among the copious coin dates may well give rise to a question as to whether the normal sign may not affect a different form as a numismatic figure.

For the definition *seventy*, I am greatly inclined to claim the appropriate representative **¤** to which Prinsep desired to attribute the function of the initial of *seven* (*sapta*).

It is necessary that this cipher should come in late among the numbers under eighty, as the Gúzrat dated plates instruct us that we have to insert "six successions to the *Gadi*" between the date of the No. 1 Valabhi grant,|| the decimal of which is the 30 above referred to—and the 3rd Valabhi grant,¶ which enters the **¤** after the identical 300 of the earlier document.

* Pp.—J. A. S. B. VII. Pl. XX.

† J. R. A. S. XII. 53, 54.

‡ J. R. A. S. XII. 54.

§ J. A. S. B. VI. Pl. XXVI.

|| J. A. S. B. IV. 481.

¶ J. A. S. B. VII. 966.

The figure for *eighty*, which is composed of two cones touching each other with their bases forming one horizontal line—does not seem susceptible of resolution into any alphabetical element, unless by a rather forced construction it were compared to a Páli श chh. This is the lapidary form of the symbol, on the silver coins it appears as a simple circle with a perpendicular line as its diameter; but on the leaden pieces of the Sáh kings* it retains the squarely-based outline, while the Rock inscriptions and the copper-plates at times, present us with a less formal contour of the cipher.

The *ninety* is formed in the one case by a duplication of the figure for eighty, when the flat basis of the single *eighty* is absorbed into the other and the combination presents four rounded corners. The numismatic character again is constructed more simply, but somewhat after the same scheme, by adding a second diameter to the circle at right angles to the single line in the cipher for 80. Though the general outline of the lapidary symbol is still retained upon some specimens of the coinage. I may here notice incidentally, that both these forms are to be found on the stone blocks of the ancient Hindu temples, collected by the Mohammedans and used in the construction of the mosque of the Kuttub at Dehli.

There is, I think, a cursive form of this figure of *ninety*, which occurs on a coin of Swámi Rudra Sáh in the decimal place in the date; an imperfect copy of this may be seen in No. 3, page 38, J. R. A. S. XII. and in the third cipher for ninety in the accompanying plate.

It remains to speak of the peculiarities of the Gupta decimals. I am able to quote the outlines only of four out of the needful nine.

The θ or 20 is found in its normal state on the coins of Kumará Gupta.

Skanda Gupta discloses two varieties of decimals, the one a form like the first Gúzrat symbol for *ten*, but turned in a different direction and possessed of an additional small cross at the top opening, the lower part of the figure however, is indistinct on *both* the specimens on which it occurs. The other sign seems to consist of the letter ट्.

And lastly Buddha Gupta's coinage supplies two possibly varying

* J. R. A. S. XII. Pl. II. 27, 28, 30, 31.

forms of a symbol that may be compared to a $\overline{\text{K}}$, all of these figures will be found duly inserted in the plate.

The Gupta coinage however, further presents us with a valuable contribution in the symbol representing *one hundred*; hitherto, amid the extensive range of inscriptions, coins and copper-plates, we had discovered no single centesimal number except the perpetual recurring *three hundred*. Were any confirmation of the coin testimony required, it has been opportunely afforded by the Násik inscriptions, in No. IX. of which will be found a counterpart of our Gupta *one hundred*. Dr. Stevenson failed to detect the correct form of the figure, and expressed himself somewhat doubtfully as to its value* and further hesitated to incorporate the sign into his table of numbers. Still, to him is due the merit of first publication, to which I willingly bear testimony!

The outline of the numismatic cipher for 100 really assimilates closely with that of the Bactro-Páli letter H, the lapidary form of the symbol, however, is compared by Dr. Stevenson to a $\overline{\text{E}}$.

Finally I have to advert to the symbol for *three hundred*, whose frequent appearance had almost led me to distrust its correct interpretation as such in *all* its positions,† until I met with the Gupta

* Journ. Bombay B. R. A. S. July, 1853, p. 54. Dr. S. says, "The figure like the $\overline{\text{E}}$ at the end of line 4th, I suspect to be a numeral for 100."

† My doubts and difficulties on this head were freely stated in my paper of 1848, to the following effect:

"A consideration that undoubtedly tends to cause distrust in the conclusiveness of the decision, which assigns the value of 300 to all the known forms of the symbol $\overline{\text{E}}$, arises from the circumstance of its appearing as the unvarying representative of *the* hundreds on both the coins and inscriptions [the Multye plates, J. A. S. B., VI. 870, may possibly prove an exception to this rule], and the singular coincidence which results from the facts that, among the many dated coins now capable of citation, and the fair proportion of *figure-dated* copper-plate grants at present known, not only must each and all, under this view of the case, be dated in 300 and odd; but likewise, strange to say, the same identical hundreds as found on these different monuments must of necessity be referred to totally distinct cycles, whose initial epochs are removed from each other by an interval of some centuries at the very least.

These observations lead naturally to the inquiry, whether, in the early stages of progressive improvement in notation, it may not have been possible that, whereas

one hundred, which proved to me that no subordinate system of increasing the power of any fixed figure by the addition of subsidiary lines or marks existed in this grade of the general scheme of numerical notation. It will be noticed, now that we have come to alphabetical comparisons—how great a similitude its quaint outline bears to the letter न as so rendered by Prinsep in the Sanchi inscription, Pl. XXV. Vol. VI. J. A. S. B. something of whose semblance is still retained in the Bengali counterpart of that letter

we find a striking want of variety in the outlines, and a marked absence of ingenuity in the expression of the distinctive forms, of the decimal ciphers, that so, in like manner, the changes in the definition of the different hundreds may have been in part effected by minor and subsidiary additions to a fixed symbol, as is still practised in the entire Tibetan numerical system. It will be seen that there is a palpable variation in the form and numbers of the side spur strokes in different examples of the figure व, passing from the occasional entire omission of the mark to the use of one or two of these lines, and in some instances (No. 6, Pl. XX., Vol. VII., J. A. S. B.) the simple lower stroke is changed into a complete subjunctive curve, making in itself a second character, similar to the body of the old alphabetical letter व N. But, on the other hand, it will not fail to be remarked that there is much latitude discoverable in the expression of many of the unit figures, whose complete identity of value there is but little reason to discredit, and hence that it would be unsafe to assume a difference of power to be conveyed in the one case, by what is possibly a mere flourish, which could not be similarly claimed for a like modification in another." (J. R. A. S. XII. 35.)

The Násik inscriptions more fully illustrate the latitude permissible in these additions to the fixed symbol, which however, in no case seem to affect its definite value. For instance, the ordinary letter व which denotes *hundreds* is modified by these linear adjuncts into वै (II. 3) वृ (V. 3) and वी (II. 3) apparently at the caprice of the original engraver (for we can scarcely suppose the modern copyist to have taken any such liberties with his materials).

Again, the व which also in its normal form represents the power of *hundreds*, is changed at one time, by a continuation of the second line of the triangle below its base, into an impossible Sanskrit compound of EY—or rather into a very correct figure of the older form of the Phœnician व B. (V. 2); on other occasions by the addition of a vertical head-line the numeral is converted into a व v. (VI. 5), while earlier in the same inscription, a further modification magnifies it into व.

So also with the sign for thousands, a reversed P (the Phœnician व), which after appearing frequently in all its simplicity of outline is subjected (in inscription VI. line 22) to the supplementation of two forward strokes, such as are used to indicate the letter अ in conjunction.

as *n*—but, the similarity of one form* of the figure with Kristna, modern Canara and Telinga alphabetical sign for the Devanágri अ, is still more striking,† though some might prefer to identify it with the letter ई i, of these types of character with whose several outlines it still more exactly accords!

In conclusion, it is requisite that I should add a few words on the table of numerals, in which I sum up the results of my enquiry.

The second compartment includes all such symbols whether lapidary, numismatic or graven on metal—that I am prepared to adopt. The third column exhibits Prinsep's original conjectural arrangement of the figures and their supposed variants. The remaining spaces are filled in with the products of Dr. Stevenson's investigations, but I must warn my readers, that I have taken a double liberty with that author's materials; on the one hand, I have copied my examples of each cipher from the transcripts of the original facsimiles of Lieut. Brett, which are lithographed at large in the *Bombay Journal*, in preference to following the outlines entered in the associate table of numbers compiled from the same sources.

On the other hand I have ventured to insert, subject to correction, two signs for *two*, which Dr. Stevenson does not definitively acknowledge in his list; but, which I obtain from his rendering of inscription No. VI.‡ The third figure for *hundreds*, under the *Satrap* heading, is also of my introduction, under similar authority.

* J. A. S. B. VII. Pl. XX. No. 6, copper-plate.

† J. A. S. B. VI. Pl. XIII.

‡ J. R. A. S. of Bombay, V. 53.

*Catalogue of Nipalese Birds, collected between 1824 and 1844.—By
B. H. HODGSON, Esq.*

To the Secretary of the Bengal Asiatic Society.

SIR,—When I went to England in 1844 I presented my immense Zoological Collections (10,000 specimens, osteological and ordinary) to the National Museum. I was immediately asked, how many of the species had been named and described, one or both, in print? I answered that all the new Mammals had been so, by myself, in the Bengal Asiatic Journal, or in the India Review, and that a vast number of the new genera and species of Birds had been described in a paper sent from Nepal just before I left it. But that paper, it was replied to me, had not appeared, and I was requested to recast it, as well as I could, from rough notes, not having retained a copy of the MS. I did so, and the paper was printed. But it did not include the whole of my ornithological stores, and it seemed expedient to put at once in print, my own complete Catalogue of Birds. Accordingly I placed that catalogue in the hands of Mr Gray for publication, and it soon after appeared in London,* substantially my own, but with its groups disposed according to the system followed in the National Museum Catalogue. The alterations I think were not always for the better, my own distribution having been founded on a careful examination of the entire organs of species in a fresh state—a vast advantage, though one, no doubt, qualified by my non-access to Library and Museum. In due time another complete Catalogue of all my collections appeared under the auspices of the Trustees of the National Museum, and therein the Curators of Zoology in that institution made such rectifications of my printed and MS. catalogues as seemed proper to them. No doubt, there was upon the whole much improvement upon my unaided work performed in the jungles. But, for the reason I have already assigned, the new determinations of species and allocations of types according to their affinities, were not always sound, and students of Himalayan Zoology have, accordingly, found it expedient

* In Gray's *Zoological Miscellany* for June, 1844.

to consult the priorly made Catalogue of Birds which, notwithstanding the changes made in it also by the same hands, yet more clearly than the latter and official one, reflected my own conceptions, particularly as to novelty of species.

Accordingly I have been frequently asked for copies of this prior Catalogue which is frequently cited by writers in Europe, but I have no more copies left and cannot comply with these requests. It seems to me that the republication of the Catalogue in our Journal might be of service to local explorers, whose labours it is the great aim of our Journal to assist and facilitate; and that this Catalogue, giving as it does, in one view, a complete enumeration of Nipalese species, must always be convenient for consultation, notwithstanding its errors. I therefore forward it for publication if the Society see fit; and I have marginally noted the chief points in which, I think, Mr. Gray has unwisely deviated from my own allocation of new types.

I am, your's truly,

B. H. HODGSON.

The numbers after the names refer to the drawings and specimens, a nearly complete series of which has been sent to the British Museum. The genera are arranged according to the system followed in that collection.*

Vulturidæ. *Gypaëtos barbatus*, 604. *Neophron percnopterus*, 605. *Vultur fulvus*, 805. *V. leuconotus*, 46. *V. bengalensis*, 47. *V. tenuiceps*, 806. *Polypteryx cupido*, v. *cinereus*? 802. *Hemigyps ponticerianus*, 804.

Falconidæ. *Buteo canescens*, 11, 12. *B. erythrura*, 779. *Hemiasetus strophiatus*, 496. *Aquila crassipes*, v. *nævia*? 1. *A. nipalensis*, vel *rubriventer*, 5. *A. milvooides*, 583. *A.?* *Daphanea*, 683. *A. vittata*, 725. *A. bifasciata*, 789. *Neopus perniger*, 2. *Butaquila leucocephala*, 859. *Nisætus grandis*, 7. *N. pallidus*, 8. *N. nipalensis*, 9. *N. pulchrior*, 680, 786. *Limnætus unicolor*, v. ? *pennatus*, 757. *Circætus nipalensis*, v. *undulatus*, *Vigors*, 4. *C. tarayensis*, 6. *C. mithilensis*, 754. *C. maculatior*, 777. *C. gallicus*, 753.

* This arrangement so far as it differs from my own (only slightly) is that of the Museum Catalogues. For the rest, the names of species, genus, subfamily and family are all my own.

Pandion indicus, 715. *Ichthyiaetus plumbeus*, v. *Horsfieldii*? 10. *I. hucarius*, 756. *Haliaetus albipes*, v. *Macei*? 3. *H. lanceatus*, 755. *Dentiger pondicerianus*, 15. *Falco thermophilus*, 21, 787. *F. milvipes*, 26. *F. peregrinus*, 29, 44, 45, 788. *F. peregrinoides*, 607, 682. *F. sultaneus*, 681. *F. micrurus*, 821. *F. subbuteo*, 50. *F. rufipes*, 48. *F. rufipedoides*, 718. *F. tinnunculus*, 38, 39, 42. *F. tinnunculoides*, 49. *F. interstitinctus*, 40, 41. *F. chicquera*, 43. *Hierax entolmus*, v. *Bengalensis*? 51, 52. *Hyptiopus (Baza) lo-photes*, 657. *Pernis bharatensis*, v. *apivorus*? 723, 727. *Elanus melanopterus*, 23. *Milvus subhemalayanus*, 13. *M. indicus*, v. *cheela*? 14. *M. rotundicauda*, 16. *Astur palumbarius*? 24, 25, 685. *A. indicus*, 27, 28, 766. *Butastur teesa*, 708. *Accipiter nisosimilis*, 30, 31. *A. scutarius*, 32, 34, 36, 37, 722. *A. subtypicus*, 33, 780. *A. affinis*, 35. *A. fringillaroides*, 660. *Circus cyaneus*, 17, 18. *C. cinerascens*? v. *pallidus*? 19, 20. *C. aeruginosus*, 22. *C. melanoleucus*, 706. *C. nipalensis*, 736. *C. plumipes*, 497.

Strigidae. *Athene tarayensis*, 63. *A. cuculoides*, 67. *A. tubiger*, 486. *A. perlneata*, v. *undulata*? *Buch.* 707. *A. badia*, 770. *Ninox Jeridius*, 670. *Scops sunia*, 64, 65. *S. lettia*, 66. *S. pennata*, v. *Aldrovandi*? 721. *Cultrunguis nigripes*, 55. *C. flavigipes*, 56. *Aetoglaux (Huhua) nipalensis*, 54. *Otus vulgaris*, 60. *O. brachyotus*, 61. *Mesomorpha (Urrua) cavearia*, v. *Bengalensis*? 57. *M. coromandra*, 742. *M. nivicola*, 827. *Mescides (Bulaca) newaren-sis*, 59. *Strix flammea*, 62. *S. badia*, 841.

Caprimulgidae. *Caprimulgus saturatior*, 174. *C. innotatus*, 175. *C. nipalensis*, 176, 177. *C. gymnopus*, 749.

Hirundinidae. *Cypselus nipalensis*, v. *affinis*? 334. *Chætura gigantea*? v. *nudipes*, *H.* 656. *Hirundo nipalensis*, 329. *H. rupicola*, 330. *H. rustica*, 331. *H. subsoccata*, 332. *H. minuta*, 333.

Todidae. *Eurystomus calorynx*, 248. *E. orientalis*, 247. *Cora-cias bengalensis*, 613. *Simornis (Raya) sericeogula*, v. *Eurylaimus Dalhousiae*, *James*, 279. *S. rubropygia*, 280.

Trogonidae. *Trogon Hodgsoni*, 178, 179.

Alcedinidae. *Alcyon capensis*? v. *princeps*, *H.* 221. *A. smyr-nensis*, 590. *A. calipyga*, 769. *A. guttata*, 364. *A. rudis*, 365. *A. bengalensis*, 606.

Meropidae. *Merops ferugiceps*, 560. *M. quinticolor*, 561. *M.*

typicus, 746. *M. viridis*, 875. *M. torquatus*, 876, (665). *Napophila* (*Bucia*) *nipalensis*, 201, 202. *N. meropura*, 762.

Upupidæ. *Upupa Epops*? *v. indicus*, *H.* 132.

Promeropidæ. *Cinnyris nipalensis*, 523, 524. *C. miles*, 525, 526, 527. *C. ignicauda*, 529, 530. *C. saturata*, 531. *C. epaulettæ*, 532. *C. strigula*, 533, 534. *C. epimecurus*, 828. *Arachnothera chrysopus*, 528. *Myzanthe* (*Micrura*) *ignipectus*, 393, 394. *M. inornata*, 395. *Pachyglossa melanoxantha*, 488.

Meliphagidæ. *Chloropsis cyanopterus*, 250, 251, 252. *C. aurifrons*, 253.

Certhidæ. *Certhia hemalayana*, *Tichodroma phœnicoptera*? *v. subhemalayana*, 372. *Sitta castaneoventris*, 399. *S. nipalensis*, 401, 402. *S. corallina*, 400. *Pnoepyga* (*Tesia*) *concolor*, 847. *P. pusilla*, 870. *P. rufiventer*, 457. *P. albiventer*, 491. *Oligura* (*Tesia*) *cyaniventer*, 489. *O. flaviventer*, 490. *Troglodytes subhemalayanus*, 396.

Luscinidæ. *Orthotomus sutorius*, *v. ruficapillus*, *v. sphœnura*? 387. *Decura* (*Suya*) *fuliginosa*, 881, (106). *D. crinigera*, *v. caudata*, 415. *Prinia fusca*, 388. *Cisticola subhemalayana*, 437. *Salicaria arundinacea*? 818. *S. affinis*, 826. *Hippolais Swainsoni*, 385. *Phyllopleuste xanthoschistos*, 380, 381. *P. affinis*, 838. *P. trochilus*, 861. *P. reguloides*, 862. *Nivicola schistilatus*, 860. *Hornis flaviventris*, 849. *H. fortipes*, 850. *Neornis*? *cacharensis*, 855. *N. strigiceps*, 382. *N.*? *flavolivacea*, 853. *Tribura luteoventris*, 851. *Horeites brunifrons*, 836. *H. pollicaris*, 848. *Abrornis erochroa*, 383. *A. schisticeps*, 468. *A. castaneoceps*, 469. *A. chloropus*, *v. Regulus modestus*, *Auct.* 889. *A. xanthogaster*, 854. *A. tenuiceps*? *v. regulus*? 856. *A. pulchrala*, 879. *Polyodon** (*Yuhina*) *gularis*, 309. *P. occipitalis*, 310. *P. nigrimentum*, 697. *Myzornis pyrrhoura*, 694. *Ixulus flavicollis*, 312. *Copsychus saularis*, 439. 440. *Grillivora longicauda*, *v. Kittacincla macrura*, 438, 731. *Phœnicura*? *leucocephala*, (*g. Chaimarrornis*), 297. *P. rubricauda*, 298

* Polyodons and Myzornis here placed in the Luscinidæ, and Alcopus inserted in the Turdidæ, should have been left, as they were placed by me, in the family of the Meliphagidæ. They are genuine Honey-suckers in habits and in structure and so also is Saroglossa inserted in the sequel under Sturnidæ!

418. *P. ruticilla*, 403, 405. *P. tricolor*, 406, 482, 483. *P. cœruleocephala*, 475. *P. schisticeps*, 813. *P. nipalensis*, v. *atrata*, 404. *Tarsiger chrysæus*, 408, 409. *Larvivora cyanea*, 455, 456. *L. homochroa*, 885. *Dimorpha (Siphia) strophiata*, 424, 430, 476, 714. *D. rubrocyanæa*, 384. *D. leucocyanæa*, 837. *Synornis joulaimus*, 421.* *S. leucura*, (*Muscicapa*, *Auct.*) 811. *Nemura cyanura*, 407. *N. rufilatus*, 484. *N. flavolivacea*, 884. *Calliope pectoralis*, 214. *C. Lathami*, 441. *Cyanecula* v. *Calliope suecoides*, 703. *Muscisylvia leucura*, 215. *Bradypterus phænicuroides*, 817. *Thamnobia scapularis*, 213. *Rubicola ferrea*, 413, 416, 417. *Saxicola saturator*, 299. *S. rubicola*, 300, 301. *S. meloleuca*, 420. *S. insignis*, 812. *Accentor strophiatus*, 414. *A. immaculatus*, v. *nipalensis*, 487. *A. cachârensis*, 873. *A. nipalensis*, 874. *Iora scapularis*, 711. *Parus sultaneus*, 344. *P. xanthogenys*, 397. *P. monticolus*, 398. *P. jouschistos*, 845. *P. melalophus*, 846. *P. dichrous*, 852. *P.?* *seriophrys*, 863. *P. schistinotus*, 716. *P. æmodius*, 830. *P. erythrocephalus*, 389, 390. *Temnorist (Suthora) atrifrons*, 470. *T. fulvifrons*, 888. *Zosterops madaraspatana*, 391, 392. *Motacilla Hodgsoni*, 133, 134, 135. *M. boarula*, 136, 772. *M. xanthoschista*, 678, 679. *M. locustrina*, 775. *Budytes calcaratus*, 667, 668. *B. citreoloides*, 732. *B. schisticeps*, 733, 773. *B. fulviventer*, 774. *B. dubius*, v. *anthoides*, 808. *Enicurus maculatus*, 347. *E. fuliginosus*, 348. *E. schistaceus*, 349. *E. immaculatus*, 350. *E. Scouleri*, v. *heterurus*, 698. *Anthus maculatus*, 435. *A. roseaceus*, v. *rufogularis*? 734. *A. hortulanus*, 791. *A. brevirostris*, 814. *A. pelopus*, 877. *Cichlops monticolus*, v. *Corydalla Richardi*? 431. *C. ubiquitarius*, 432, 433. *C. thermophilus*, 735. *C. fortipes*, 738.
- Turdidæ*. *Chlorisoma venatoria*, 210, 211. *Myophonus metallicus*, 224. *M. Temminckii*, 225. *Pitta cyanoptera*, 454. *P. rodogaster*, 761. *Heleornis (Paludicola) nipalensis*, 453. *Cinclus Paliasii*, 240. *C. P. young?* v. *maculatus*, 241. *Petrocincla cyanota*, 584, 585. *P. homochroa*, 586. *P. cyanea*, 259. *P. erythrogaster*

* 421 fém. 811 mas. of my Joulamus, the leucura of Gmelin and rubeculoides of Sykes who makes the former a *Muscicapa* and the latter a *Saxicola*.

† *Temnoris* next Gould's *Paradoxornis* and our *Heteromorpha* and *Conostoma* also perhaps.

351, 352, 353. *Orocetes cinclorhynchus*, 359—362. *Petrophila turdoides*, 587. *Zoothera monticola*, 268, 269. *Turdus pœcilopterus*, 184—186. *T. oreocincloides*, 197. *T. atrogularis*, 198, 199. *T. erythrurus*, 200, 720. *T.?* *picaoides*, 363. *T. rubrocanus*, 575. *T. Naumannii*, 790. *T. viscivorus?* 832. *Merula nivicollis*, 182, 183. ? *Grandala cœlicolor*, 844. *Oreocincla Whitei*, 194—196. *O.?* *rostrata*, 833. *O.?* *micropus*, 158, s. g. *Turdulus*. *Hemipteron nipalense*, 377. *Crateropus rufimentum*, 187. *C. ocellatus*, 191. *C. moniliger*, 192. *C. grisauris*, 193. *C. albogularis*, 204. *C. leucolophus*, 205. *C. cœrulatus*, 493, 494. *C. variegatus*, 693. *C. affinis*, 768. *C. erythropterus*, 820. *C. erythrocephalus*, 163? *Trochalopteron melanura*, v. *Zanthoc. squamata*, *Gould*, 376. *T. setifer*, 317. *T. subunicolor*, 842. *Timalia pellotis*, 315. *T. leucotis*, 316. *T. pileata*, 835. *Pyctoris hypoleuca*, v. *Timalia hyp.* *Auct* 704. *Mixornis ruficeps*, v. *Timalia gularis*, *Horsf.* 699. *Strachyris nigriceps*, 356. *S. pyrrhops*, 410, 411. *S. chrysæa*, 869 *Erpornis** *zanthochlora*, 760. *Malacocercus griseus*, v. *terræcolor*, 371. *M.?* *abornis*, 816. *M. geochrous*, 868. *Pomatorhinus erythrogenys*, 237. *P. schisticeps*, 288. *P. ruficollis*, 239. *Keropia striata*, 266, 267. *Oriolus Traillii*, 260, 261. *O. galbula*, 262. *O. melanoris*, 263. *O. Hodgsoni*, 264. *O. juv.?* *strigipectus*, 265. *Trichophorus xanthogaster*, 346. *Hemixus flavala*, 244. *Hypsipetes psaroides*, 242. *H. viridis*, 343. *Alcopus (Sibia) picaoides*, 246. *A. nigriceps*, 258. *Alcurus melanocephalus*, 245. *A. nipalensis*, 343. *Ixops nipalensis*, v. *Actinodura?* *Gould*, 257. *Ixos cafer?* v. *pygæus*, 207. *I. leucogenys*, 208. *I. jocosus?* v. *pyrrhotis*, 209.

Muscicapidæ. *Muscicapa æstigma*, 140. *M. ciliaris*, 141. *M.?* *terræcolor*, 286, 287. *M. melanops*, 288, 289. *M. acormus*, 478. *M. hemileucura*, 797. *M. leucoschista*, 824. *Digenea leucomelana*, 419. *D. tricolor*, 795. *Hemipus picæcolor*, v. *Muscicapa*

* *Stachyris*, *Erpornis* and *Mixornis* stood in my arrangement near to *Iöra*, *Chloropsis*, &c. among the *Brachypods*, and *Alcopus*, as already noted, among the *Meliphagidæ*, and such I still think are their proper places.

817 *Bradypterus*, alias *Hemiptilon*.

699 *Mix. ruficeps*, alias *chloris*, alias *gularis*.

734 *Pyctoris*, alias *Chrysomma*. Type, *Tymalia hypoleuca*, *auct.*

picata, 285. *Hemichelidon ferruginea*, 425. *H. fuliginosus*, 427. *Bainopus irenoides*, 284. *Chaitaris (Niltava) rubeculoides*, 137—139. *C. sundara*, 142, 422. *C. sordidus*, 423. *C. fuligiventer*, 143. *Muscipeta paradisea*, 281—283. *Rhipidura albogularis*, 426. *Myiagra cœrulea*, v. *occipitalis*, 730, 485. *Cryptolopha poiocephala*, 428, 429. *Chelidorynx hypoxantha*, v. *Rhipidura hypoxantha*, *Blyth?* 386.

*Ampelidae.** *Leiothrix calipyga*, v. *furcatus?* 354, 355. *Certhi-parus (Minla) ignitincta*, 311, 313. *C. castaneiceps*, 477. *Proparus (Siva) viniperectus*, 479, 480. *P.?* *chrysæus*, 591. *Fringilliparus (Mesia) argentauris*, 307, 308. *Joropus (Siva) strigula*, 314. *J. nipaensis*, 357. *J. cyanouropterus*, 358. *Prosorinia (Cochoa) purpurea*, 180, 181, 577. *P. viridis*, 221, 222. *Pteruthius erythronotus*, 232, 233. *P. xanthochlorus*, 446. *Heterornis (Cutia) nipaensis*, 254, 255. *Pericrocotus*, v. *Phænicornis princeps*, 290, 291. *P. brevirostris*, 292—294. *P. peregrinus*, 295—297. *P. sordidus*, 750. *Graucalus papuensis?* *nipaensis*, 318, 319. *Volvocivora† melaschistos*, 517—519. *Ocypterus rufiventer*, 741. *Dicerurus fin-gah?* v. *albibictus*, 550, 551. *D. pyrrhops*, 553. *D. macrocerus?* v. *annectans*, 675, 676. *D. niviventer*, 700. *D. hemidicerurus*, 758. *Preopterus (Chaptia) æneus*, v. *muscipetoides*, 578. *Cometes (Chibia) crishna*, 564. *C. grandis*, 567. *Melisseus (Bhringa) remi-fer*, 554.

Laniadæ. *Tephrodornis pelvica*, 234, 235. *T. leucura*, 236. *Col-lurio nipaensis*, v. *Tephronotus*, 230, 231. *C. ferrugiceps*, 481. *C. obscurior*, 691. *C. jounotus*, 815. *C. Hardwickii*, 871. *C. trico-lor*, 229.

Corvidæ. *Garrulus lanceolatus*, 173. *G. bispecularis*, 206. *Cya-nurus?* *erythrorhynchus*, 203. *Crypsirina vagabunda*, 189. *C. sinensis*, 190. *Conostoma æmodium*, 661. *Heteromorpha unicolor*, 843.‡ *Nucifraga hemispila*, 219, 220. *Corvus macrorhynchos?* v. *Corone?* 218. *C. splendens*, v. *impudicus?* *Fregilus graculus*, 840.

* See Monograph of this group in Corbyn's India Review and in J. A. S.

† Volvocivora to next family or Laniadæ.

‡ Heteromorpha next Paradoxornis and Temnoris.

Sturnidae. Saraglossa spilopterus, 370.* Eulabes v. Gracula religiosa, 302. Pastor roseus, 673, 726. P. pagodarum? v. nigriiceps, 270. P. malabaricus? v. caniceps, 271, 272. P. tristis, 303. P. cristatellus, 304. P. gregicolus, 710. Sturnus indicus, 306. Sternopastor contra, 305.

Fringillidae. Ploceus flavigula, 451. P. melanogaster, 655. P. passerinus, 70. P. atrigula, 743. Coccothraustes melanozanthus, 326, 327. C. carnipes, 328. C. icterooides, 829. Spermestes melanocephalus, 322, 321. S. lineoventer, v. leuconota? 324. S. (Lonchura) acuticauda, 325. S. fuscoluteus, 87. Carduelis spinoides, 442—444. Procarduelis nipalensis, 460, 461. Pyrgyta domestica, 447, 448. P. montana, 449. Gymnoris flavirostris, 864. Fringilla lauda nemoricola, 450. Emberiza nipalensis, v. erythroptera? 341, 342. E. sordida, v. chlorocephala? 445. E. oinopus, s. g. Ocyris, 473, 474. E. aureola, 793. Heterura sylvana, 436. Alauda leio, pus, v. orientalis, 728. A. triborhyncha, v. leiopus? 739. A. dulcivox, 867. Heterops cristatus, 729. Corypha baghaira, 434, 815. Plocealauda typica, 724. Pyrrhulauda cruciger, 809. Propasser rodopepla, 340. P. sordida, young of pulcherrima? 452. P. pulcherrima, v. Pr. rodochroa? 465—467. Pyrrholinota roseæcolor, v. Pyrrh. rosea? 464. Pyrrhoplectes epaulettæ, 462, 463. Propyrhula subhemachalana, 471, 472. P. rubeculoides, 831. P. sipahi, 320, 321. Pyrrhula erythrocephala, 335—338. P. nipalensis, 329, 498, 499. Loxia hemalayana, 887.

Bucerotidae. Buceros cinerascens, 58. B. homrai, 599. B. nigralus, 666. Aceros nipalensis, 600—602.

Psittacidae. Palaeornis rhodocephalus, 273, 709. P. mystaceus, v. ponticerianus, 274, 695. P. schisticeps, 275—277. P. nipalensis, 278, 674. P. nigrirostris, 696. P. torquatus? 701, 702. Psittacula pyropyga, v. vernalis? 609, 610.

Picidae. Bucco caniceps, v. viridis? 170. B. cæruligula, 171. B. igniceps, 172. B. grandis, 217. Piculus nipalensis, 161. P. rufifrons, 162. Comeris (Sasia) ochracea, 659. Picus sultaneus, 165, 166. Dryotomus flavigula, v. flavinucha? 167, 168. Chloro-

* Saroglossa to Meliphagidae; a very interesting form placed in genus Lamprotornis by Vigors, which has led, I suppose, to its disposal here under the Sturnidæ, with which it has no affinity.

nerpes? pyrrhotis, 492, 687. Dendrocopos cathpharius, 154. D. hyperythrus, 151, 142. D. pyriceps, 153. D. majoroides, 155, 156. D. brunnifrons, 157, 158. D. moluccensis, 159, 160. Brachylophus sericollis, 145, 146. B. xanthopygæus, 147. B. squamatus, 148. B. occipitalis, 149, 150. Brachypternus Shorii, 163, 164. B. igniceps, 520. Meiglyptes badius, 169.

Cuculidæ. Phænicophagus montanus, 212. Zanclostomus sirkii, 226. Oxylophus coromandus, v. rubrarmus, 611. O. serratoides, 612. Eudynamys orientalis, 249. Centropus pygmæus, 495, 522. C. philippensis, 594, 595, 692. Cuculus hemalayanus? v. bharovus, 501. C. canorus, 503, 506. C. micropterus, 504, 507. C. saturatus, 505, 690. C. sparverioides, 509—511. C. niger? v. pyromatus, 512, 514. C. brevipennis, 513, 689. C. nisicolor, 872. Pseudornis diceruroides, 502. Chalcites xanthorhynchus, 515, 516.

Columbidæ. Vinago sphenura, 93, 94. V. militaris, 104, 105. Ptilonopus turturoides, 100, 101. P. macronotus, 102. Romeris (Toria) aromaticæ, 103, 688. Rhinopus (Ducula) insignis, 216, 92. Dendrotreron Hodgsoni, 98, 99. Columba pulchrala, 88, 89. C. leuconota, 95. C. domestica, var. 97. C.? pulchricollis, 737. Monornis perpulchra, 91. Turtur vitticollis, 96. T. douraca, 107. Coccyzura tusalia, 663. Gæna murmensis, 747.

Phasianidæ. Crossoptilon tibetanum, 785. Phasianus Wallichii, 76—78. Epomia Amherstii, 85. E. picta, 86. Euplocomus leucomelas, 79, 80, 771. Gallus Bankiva, 74, 75. Tragopan satyrus, 69, 72. Lophophorus Impeyanus, v. refulgens, 73. Gallophasianus pucrasia, 68, 71.* Tetraogallus Nigellii, 781. Ithaginis cruentatus, 81—84. Tetraoperdix (Lerwa) nivicola, 108, 109. Francolinus gularis, 378. F. orientalis, 379. F. vulgaris? v. brevipes, 630—632, Pyctes (Chaeura) chukor, 110. Arboricola olivacea, v. torqueola, 111, 113, 114. A. rufipes, 112. Coturnix textilis? v. pluvialis, 119, 120. C. philippensis, 128, 129. C. dactylisonans? v. indicus, 130, 131. Perdicula rubicola, 763, 764. Hemipodius joudera, 121. H. Dussumieri? v. variabilis, 122, 123. H. taigur? v. plumbeipes, 126, 127. Pterocles arenarius, 784. P. pictus, 782. P. exustus, 783.

* Gallophasianus was originally applied by me to the Kâlîches, which are, in structure and in geographic distribution, a most perfect link between tropical Gallus and boreal Phasianus.

Otidæ. *Otis bengalensis*, v. *deliciosa*, 115. *O. aurita*, 116, 117.
O. nigriceps, 778.

Charadridæ. *Edicnemus crepitans*, 53. *Pseudops griseus*, 118.
Cursorius tarayensis, 574. *Glareola nipalensis*, v. *cinerascens*, 658.
G. thermophila, v. *longipes*, 799. *G. gangetica*, 825. *Squatarola cinerea*, 672. *Vanellus cristatus*, 625. *Philomachus ventralis*, v. *spinosis*, 227. *Sarciophorus fuscus*, 810. *Lobivanellus goensis*, 228. *Charadrius pluvialis*, 535, 536. *C. rufinus*, 669. *C. subrufinus*, 124, 125. *Hiaticula minor*, 628. *Hæmatopus ostralegus*, 807.

Ardeidæ. *Anthropoides virgo*, 588. *Ardea purpurea*, 592. *A. insignis*, 645. *A. cinerea*, 646. *Egretta chloriceps*, v. *virescens*, *Auct.* 622. *E. cinnamomea*, 623, 624. *E. flavicans*, v. *russata*? 638, 647. *E. nigrirostris*, 639, 641. *E. maronata*, 642—644. *E. modesta*, 794. *Nycticorax europea*, 635—637. *Platalea pyrrhops*, 144. *Ciconia leucocephala*? v. *biclavata*, 521. *C. nigra*, 620. *Mycteria australis*, 801. *Osteorophea immigratoria*, 713. *Tantalus rodopteron*, v. *leucocephalus*? 800. *Ibis falcinellus*, 571. *I. (Pseudibis) papillosa*, 619. *I. aimolene*, v. *melanocephalus*, 865.

Scolopacidae. *Numenius arquata*, 614. *N. arquatula*, 615. *N. phæopus*, 616. *Limosa melanura*, 537. *Clorhynchus strophiatus*, 576. *Totanus calidris*, 367. *T. macularius*? v. *auratus*, 368. *T. glareola*, 369, 745. *T. glottoides*, 549. *T. hypoleucus*, 557. *T. ochropus*, 744. *T. glareoides*, 748. *T. fuscus*, 798. *Recurvirostra avocetta*, 573. *Himantopus melanopterus*, 516. *Tringa pusilla*? v. *Temminckii*? 629. *T. variabilis*, 740. *T. minuta*, 751, 752. *Machetes optatus*, 366, 823. *M. pugnax*? 412, 597. *Rhynchæa capensis*? v. *indica*, 538, 539. *Gallinago nemoricola*, 540, 541. *G. media*? v. *uniclavata*, 542, 543. *G. heterura*, v. *biclavata*, 544, 545. *G. solitaria*, 547, 548. *G. gallinula*, 608. *Scolopax rusticola*, 546.

Palamedidæ. *Parra sinensis*, 563. *P. superciliosa*, 570. *P. indica*, 719. *P. phænicura*, 572.

Rallidæ. *Zapornia flaminea*, 374, 375. *Z. pusilla*, v. *Bailloni*, 568, 569. *Z. thermophila*, 759. *Z. nigrolineata*, 765. *Porphyrio hyacinthinus*, 562, 662. *Gallinula chloropus*, 633, 634. *Fulica atra*, 621.

Anatidæ. *Anser rubrirostris*, 579. *A. indicus*, 593. *Mycrocygna girra*, 796. *Dendrocygna arcuata*, 581. *Tadorna vulpanser*, 580.

T. rutila, 803. *T. ? phoe*, 819. *Anas mail*, 500. *A. boschas*, 653. *A. ? vitticeps*, 677. *Rhynchospis clypeata*, 651, 652. *Dafila caudacuta*, 459, 454. *Mareca poecilorhyncha*, 792. *Querquedula crecca*, 617, 618. *Q. vulgaris*, 767. *Fuligula vulgaris*, 373. *F. ? cheonea*, 458. *F. nyroca*, 648, 649. *F. leucophthalmos* ? 650. *F. caryophyllacea*, 664. *F. rufina*, 686, 822. *F. cristata*, 712. *Mergus serrator*, 626, 627. *Cygnus ferus*, the wild swan, whereof, strange to say, I procured a sample in the valley of Nepal during a most unusually inclement winter.

Podicipedæ. *Podiceps minor*, v. *pandubia*, 558. *P. cristatus*, 834.

Larideæ. *Xema ridibunda*, 566. *X. pallida*, 857. *Sterna roseata*, 565.

Pelecanidæ. *Pelecanus gangeticus*, 582. *P. calirhynchus*, 92. *Carbo pygmaeus*, 552. *C. raptensis*, 555. *C. javanica* ? v. *raptensis*, 559. *C. leucocephala*, 596. *Plotus melanogaster*, 655.

The list consists of 652 species: 89 being Raptorial; 407 Passerine; 44 Gallinaceous; 77 Wading; and 35 Natatorial Birds.

Notes on Northern Cachar.—By Lieut. R. STEWART, 22nd Regt., B. N. I.

North Cachar, including that portion of the country called Toolaram Sonapaty's, is bounded on the north by the rivers Jumoonah and Hurriahján, which separate it from the Assam district of Now-gong. On the east the river Dhunseeree, rising among the Burrail mountains and flowing northward, is our frontier with the independent tribes of Angami and Kutcha Nagas. A huge range of mountains called the Burrail, running directly east and west forms the line of demarkation on the south, with Cachar Proper. And on the west, the Cossilee, and one of its small tributaries called the Umpung, rising in the Burrail range, and flowing northward, divide it from the Cossiah and Jynteah hill country.

The form enclosed by these boundaries is that of a rude square, of about 3000 square miles in area: all lying within the water-shed of the Birhampooter, and on its left bank, though removed from the stream toward the uplands. This tract is for the

most part mountainous, and covered with dense forest and bamboo jungle, intersected by numerous streams which find their rise in the Burrail and lower ranges, and flow towards the plains to the north.

The population, consisting in all of about 30,000 souls, is composed of no less than six different tribes, all having distinct languages, manners and customs. They are thinly scattered throughout the country in small village communities, the greater part being located towards the south, close to the high range; vast belts of forest in the north and the whole line of frontier to the east, being left unoccupied: the first on account of the intricacy and impracticability of the country, and the second from the dread of the ravages of the Kutcha and Angami Naga tribes.

North Cachar is most easily approached from the southern side, that is from Cachar Proper. There are no less than three distinct routes from Silchar to Apáloo, the sunder station of the district.

The shortest of these is that via Oodharbund, a village in the plains, about ten miles north of Cachar. On leaving this village, the road proceeds for some way up the bed of the Madoora river, and then, after surmounting the lower ranges of hills lying at the foot of the Burrail, boldly runs up the face of those mountains themselves, nor does it seek, by zigzagging or circumvention, any means of alleviating the toughness of the "pull" which in some places is tremendous.

Nothing can be less interesting than a journey by this route. The moment the traveller has left Oodharbund, he finds himself walking between two high walls of jungle, which it is impossible for the eye to pierce. This jungle in the lower ranges is composed of a small species of bamboo, the stalks growing exceedingly close to one another: higher up, the first striking change is that of a larger bamboo, which takes the place of the smaller kind, and grows in clumps instead of singly. Interspersed with these are gigantic bamboos growing to the height of sixty or seventy feet, and measuring eight or ten inches in diameter at their base. When half way up the Burrail range, bamboos of all kinds give place to a timber forest, where huge trees of various sorts abound. Here, indeed, some scenes of great beauty present themselves. The rich and varie-

gated foliage of the trees, the huge, gnarled and moss-grown trunks and branches, and the profusion of creepers, which, rope-like, bind all the trees into a most inextricable tangle over head, and hang in quaint festoons from the higher branches, might well form the subject of an exquisite painting. But a great amount of dampness prevails throughout, and the eye gets wearied with gazing on perpetual sylvan vistas without any thing of stirring life to relieve the tedium. So thick is the forest that at no place but one, on the whole line of road up the face of the hill, are the plains of Cachar visible. At this place the eye enjoys the freedom for a short time given to it, although the view itself presents nothing particularly interesting. Upon accomplishing the descent on the northern side of the range, which is marked by the same changes of vegetation as that on the south, North Cachar may fairly be said to have been reached. The road proceeds thence to the station of Apáloo, crossing the Jatinga river, which is here a small stream, then passing over and running along small ranges of hills covered with dense bamboo jungle, and crossing the rivers Dyung and Mahour. The journey to Apáloo by this route may be performed with care in five days, and on an emergency may be accomplished in three.

The next road is that up the bed of the Jatinga river, and is reached from Silchar via Burkholia, a village in the plains, about twelve miles north-west of the station. After leaving Burkholia, the road crosses a low range of hills, and descending on the river pursues its course along the banks or in the bed of the stream, and by an almost imperceptible ascent up the valley reaches that spot, where the road by Oodharbund crossed the river, from which point both routes unite.

Eight miles is added to the distance if this route be chosen in preference to that by Oodharbund, but the traveller is relieved from the equivalent of twice that distance in fatigue arising from the avoidance of abrupt ascents.

If a good road be ever constructed between Silchar and Apáloo, this is indisputably the route which should be adopted; although some obstructions which now exist, would have to be removed. Huge rocks block up the whole of the bed of the stream and the valley for about three miles, along the road. A few hundred pounds

of gun-powder would, however, soon clear a road through them, and a greater outlay might also, I think, serve to open out the navigation of the river itself to rafts, by means of which the fine timbers growing in the valley might be floated down to market during the rainy months. Two days' journey up the river, brings us to a wide portion of the valley covered with forest, and abounding in fine Jharul timber of great value. The valley in the neighbourhood of this spot, which is called the Megpur forest is thickly interspersed with Cacháree and Kookie villages, and it is pitiful to see the ruthless spoliation which the noble trees are undergoing at the hands of these people; the timber after being cut down, being left to rot or burned for the purpose of enriching the soil.

The scenery on this route is a great improvement on that viâ Oodharbund, the river forming an ever-varying and pleasant feature. The banks are, in some places, abrupt and rocky, rising to the height of many feet; in other places, such as the Megpur forest, the valley widens and forest scenery comes into play.

The third route from Cachar is one seldom or never used, although I have penetrated into the country by it myself. It is much longer than the other two, occupying, at the least, and under favourable circumstances, five days. It proceeds viâ Lukhipur, a village in the plains some sixteen miles east of Silchar, and on reaching a low range of hills called the Hoorung, skirts along them in a northerly direction, until it arrives at the banks of the river Chinám, along the bed of which it proceeds until it reaches the hill on which Baladhun (a large Naga village) is situated, when it branches off up the bed of one of its tributaries, and pursuing its course up to its very source on the summits of the Burrail, descends through a gorge, right down upon Apáloo itself.

Miles of this road, when traversing the low lands in the neighbourhood of the Hoorung range, lie across large morasses of thick alluvial mud: here footing is obtained by means of what are called paddy-bridges, which consist of a series of bamboos lashed two and two together, in the form of an \times and planted firmly in the ground: these again are connected at their junctions by other bamboos laid across, and lashed thereto, along which the traveller must poise himself, as best he can. It is astonishing to see how

carelessly those who are accustomed to this system, trudge along this frail framework, where the footing, consisting as it frequently does of but one bamboo, is exceedingly precarious. Coolies laden with heavy burdens, pass as securely as if on terra firma.

The ascents on this route are also very considerable, especially the last one up the Burrail. The scenery is in many parts very interesting. The Chinám is a large mountain torrent, and both that river and its tributary abound in scenes highly picturesque.

The approach from Nowgong in Assam is, I am told, an excessively tedious one as well as uninteresting. It occupies between a week and ten days, lies for three days in the plains, after which it enters an extensive and unhealthy terai, crosses a number of low ranges of hills, and gradually encountering higher ones, reaches at length the more central portion of the district.

Ready access can, however, be had during the rains and, indeed through greater part of the year, to the more northern parts of the district, by means of the rivers Copilee, Dyung and Dhunseeree, which are navigable, to boats of small burden and rafts, a considerable way into the interior.

The approach from Cherrapunji lies viâ Kálápáni and through the independent territory of Rájá Sing Mánik, and part of Jynteah hill. The scenery on this route is described as very beautiful, and it passes through the most thickly populated part of the hills. Yet it is little frequented except by a few Cossiahs, who venture into North Cachar for the purpose of buying cotton from the Kookies. There appears to be a marked difference between the character of the Cossiah and Jynteah hills and those of Northern Cachar, the former being grass covered, with forest bottoms, and the latter overgrown with bamboo jungle, and having the forests chiefly on a high level instead of a low one. This change does not take place gradually along the route, but the moment the Copilee, (which would seem to be the natural boundary between the two countries,) is crossed, it is at once perceptible.

A route is said to exist from Munnipur to North Cachar, lying through part of the country of the Kutcha Nagas. It is described as being a week's march over very difficult country, but I have no further information regarding it.

It must be understood that all the roads mentioned by me, are mere foot-paths cleared through the jungle, and perfectly impassable to all but foot-passengers. It would be impossible for even a hill pony to go along many of them, and no one could venture to ride for more than a mile or two at a stretch on favorable ground, on any one of them. The best method of proceeding, therefore, is by those means with which nature has supplied us; and, difficult and irksome as walking in such country is, it will be found preferable to the only other means of locomotion that exists, and to which those incapable of being on their legs for six hours a day, are obliged to resort. Palanquins and tonjons are out of the question. Independently of their being no bearers to carry them, it would be impossible to convey them round the sharp corners of the paths as they pass between rocks and trees, and still more so, along the faces of precipices, where there is only footing for a single individual at a time. If it is necessary to be carried, a slight litter of bamboos is constructed, in which there is space for a person to sit tailor-fashion, and in this position and no other he is obliged to sit during a six hours' daily journey, while twelve or sixteen coolies support and carry him along, at the rate of about two miles an hour.

In marching in the hills, by such foot-paths, six hours a day including one hour's halt, must be devoted to the road, as the pace can never exceed three miles an hour, and seldom even come up to it. A start after breakfast, at about 8 or 9 o'clock, brings you up to your ground, removed about ten or fifteen miles from the last encamping place, at 3 or 4 in the afternoon. The coolies who accompany you on the march, are then set about to erect a temporary hut, which they do in an incredibly short time, and in the course of two hours you are lodged in a tenement impervious to sun and rain.

The general appearance of N. Cachar when looked down upon from one of the higher ranges, is that of a number of low worm-like hills most intricately intertwined, and covered with dense bamboo jungle which lies here and there felled in large and small patches, on which cultivation is carried on.

Viewed from a distance, the height of the bamboos being uniform,

the regularity and evenness of their tops has the appearance of lawn-like grass, and a huge tree (perhaps the remnant of some former forest) rising here and there, in the jungle, and towering high above the tops of the bamboos, adds much to the deception. This illusion is, however, completely destroyed when the descent has been made, and it is found that instead of traversing the smooth grass of a park, it is necessary to proceed along a road wedged in between two walls of bamboo, thirty feet high, stumbling at every step owing to the irregularity of the ground.

As we proceed north, bamboo jungle, though common, is not so frequent: its place is gradually taken by small trees with which it is often interspersed, and which cover the low hills from summit to base, and by the time we reach the plains we are in high tree forest, of which the terai is composed.

The whole of Toolaram's country may be characterised as 1800 square miles of tree jungle, 400 miles of which are in the plains, and form part of the terai, the remainder being heaved up into a series of low ridges and undulating hills, only fourteen square miles of the whole being under cultivation. Yet the country is extremely fertile, as all tracts must be, which lie at the foot of lofty ranges.

Villages of Cucharees, Kookies and Nagas are pretty plentifully scattered about the southern and central portions of the district, and sometimes, when perched in prominent places, as those of the Nagas invariably are, add much to the interest of the view, which has generally too much of sameness in it to be pleasing.

The Burrail range running along the entire southern boundary of the district, is the most stupendous and beautiful feature in it. These mountains are very irregular in their formation, and throw out peaks and spurs and ridges in all directions, their summits and sides for a considerable distance being crowned with glorious timber forests. Nothing can exceed the beauty of these hills, as viewed from certain positions and in certain lights: the effect of the dark-coloured foliage standing out in relief against a clear sky showing minutely the picturesque irregularity of their outline, is not equalled by any other hill-scenery I have ever met with.

The height of these mountains is, I should say, about 2500 feet

above the general level of the country which, again, may be about 1500 feet above the level of the sea, many of the peaks of the Burrail may rise, however, to 5000 feet above the sea or even more.

On clear days the snowy ranges of the Bhootan mountains, on the northern side of the Burhamputer, are distinctly visible, but at too great a distance to produce any marked effect, being generally much obscured by the low clouds which hang above the horizon.

The climate of North Cachar, is on the whole very agreeable, the temperature of those places in it which are at all raised, being, on an average, at least 8° Fahrenheit below that of the plains of Cachar, the maximum temperature, during the hottest months, never exceeding 85°, and the minimum during the same time 72°. The chief objection to the district as a residence, is the constant violent wind that blows upon it from the south, through the gorges of the Burrail range. This wind would appear to come directly from the plains of Cachar, and yet Cachar is far from being a windy district, and, with the exception of a few storms, at the end of the cold weather, enjoys almost a perpetual calm.

When I first visited these hills, the season being that in which the jungle (cleared for the purposes of cultivation) is burned, huge fires were prevalent throughout the country. The magnitude and fierceness of these fires are beyond anything I ever saw or heard of—not even the fire of London, or the blazing Prairies of America can be compared with them. Whole mountains are in flames, tongues of flame fifty or sixty feet in height leaping up all around them. I thought, possibly, these great conflagrations, by rarifying the air in their immediate neighbourhood to a considerable extent, might cause a rush of wind to supply the place of the atmosphere thus exhausted. But the violent winds continued for months after the cleared jungle was all burned down, and I was forced to give up my theory.

I begin to think that this constant wind must be an upper current of sea-breeze from the Bay of Bengal, which passes over the low hills of Tipperah, and the plains of Cachar, until it is broken by the high Burrail range, when it precipitates itself down the gorges and valleys of those mountains into the country beyond. But I have no argument to offer in support of this theory.

My observations of the climate have hitherto applied only to Apáloo, and those parts of the hills considerably above the general level of the country, though not on the greatest heights. Here the climate is healthy and with the exception of the wind, pleasant. It is far otherwise, however, in the valleys and dells between the hills, and generally in the whole tract to the north, including Toolaram's country. There the rankness of the vegetation and the malaria emitted from decaying vegetable matter, spreads disease and death, even among those who from long residence have become accustomed to such localities. A European or native of the plains has little chance of escaping with his life, should he be detained for any time in the low grounds.

Toolaram's country must, I fancy, be the most insalubrious place in the whole world. Independently of the effects of the malaria, all epidemics, such as cholera and small-pox are prevalent, and it is not astonishing, therefore, that we find a population of 6200 persons only, occupying such an extensive tract, although the paucity of people has been ascribed to the misgovernment of the late rulers.

North Cachar is not, apparently, visited with such floods of rain as the Cossiah hills, although of course a greater quantity must fall among mountains than on the plains. Yet I think there can be but a slight difference between the fall in the plains of Cachar, and that at Apáloo. Clouds hang pretty constantly on the peaks of the hills, and a considerable amount of rain may fall on the higher levels, but the torrents carry it all off, and no effect is produced by the fall on the lower ground.

Dense fogs and mists are very frequent, and the climate is every where a damp one. Books, furniture, dresses, &c. stand no chance with it, although it has been found to agree pretty well with both Europeans and natives of the plains; the latter, however, suffer greatly on first coming up, being subject to fevers, and a mild form of dysentery; this may, however, be induced more by a change in diet, the hill rice differing considerably from that of the plains, than by any baneful effect of the climate.

There are very few remarkable places in North Cachar, nothing interesting concerning the history of the country being known, all that is known being confined within the last half century.

The entire district, as it now stands, formed a portion of the dominions of the Rájáhs of Cachar, who were in the habit of exacting revenue, consisting of ivory, wax, rice, and other articles of produce, from all the mountaineers east of Jynteah to Manipur. On the death of Gobind Chunder the last Rájáh of Cachar, in default of successors, Cachar lapsed to the British Government, in the year 1830, and with it we also became possessed of the mountainous tract of country to the north. Circumstances, however, which had occurred during the latest years of the native sovereignty of the province, induced us to take but a small part of the hilly country immediately under our own government.

In the reign of Gobind Chunder, a menial in his service of the name of Kohee Dau pushed himself sufficiently forward to be appointed governor of the hill country attached to the kingdom. Once removed from his master he had influence sufficient to instigate a successful rebellion, and establish his own independence, which in due time was acknowledged by Gobind Chunder himself. But shortly afterwards, being decoyed down to the plains, he was treacherously assassinated, at the hands of his former master. His son Toolaram escaped, and for a long time led a roving life in the hills, maintaining his independence, notwithstanding the forces sent against him by the Rájáh of Cachar.

In 1824 Toolaram joined the Burmese in their invasion of Cachar, and drank his full meed of revenge in the fire and sword which they spread through the kingdom of his enemy. The alliance of a man like Toolaram must have been of great service to the Burmese in their enterprise. His local knowledge alone was worth half an army to an invading force such as they were, and indeed without his aid it would have been impossible for them to have made good their retreat before our army, which they did through the hills in the N. E. corner of Cachar, a place called "Bágna kóna" to this day in memory of the flight.

On the withdrawal of the Burmese, Toolaram was left in his old position as regards his territory, though better able to resist his old enemy, Gobind Chunder, who nevertheless made frequent attempts to expel him.

In 1828, Toolaram, though able to withstand all attacks from

without, was obliged to succumb to treachery from within, and a much trusted cousin of his seized his government, and compelled him to fly for refuge to Jynteah.

In 1829 Toolaram, having obtained the assistance of Gumbheer Singh, Rájáh of Munipur, retook his country, forcing his cousin to fly for protection to the Rájáh of Cachar.

After this an interference took place on the part of the British Government, which obliged Gobind Chunder to make over certain parts of the hills to Toolaram. Gobind Chunder was murdered in 1830, and Cachar lapsed to the English, Toolaram still holding his place, and being kept in possession by us against further attempts made by his cousin to dethrone him.

In 1833 Toolaram executed two British subjects, on a charge of having conspired against his life. For this act he was tried at Gowhatti in Assam, and acquitted, upon it being shown that, as an independent chief, he had power of life and death over malefactors in his own territory.

But care was taken to reduce this power, and by a treaty of 1834 his dominions were curtailed and his power limited to the trial of petty cases within them, all heinous offences being rendered subject to our officials alone. He was moreover called upon to pay an annual tribute of four pair of elephant tusks, and, to make him more dependent, became the recipient of a pension of Rs. 50 per month.

In 1844 Toolaram, having become infirm and old, prayed that Government would transfer the management of his country to his two sons; this was done, and until 1853 it remained in their hands.

But the young men did not appear to possess administrative abilities. They quarrelled among one another, and the business of the state was allowed to get into confusion. The inhabitants were oppressed and fled, and the country became a place of refuge for all the great criminals and defaulters of the neighbouring districts, who, once across the boundary, could never again be heard of. Every article of the treaty of 1834 having been frequently broken by these rulers, it was thought incumbent upon the death of Toolaram, and consequent on the event of one of his sons losing his life in waging a war, in direct contravention to the above treaty, to put a stop to the regular succession, and annex the country to our own dominions.

This measure was very skilfully carried out by Lieut. Bivar in the cold weather of 1853-54, and it is to him that I am indebted for my information regarding the country.

On the death of Gobind Chunder, therefore, it was only a small belt of the hill-country, about 1200 square miles, that came into our possession, and this tract was placed under the jurisdiction of the Superintendent of Cachar. In 1839 it was transferred to the Assam authorities, it being supposed, that they were better able to protect it from the ravages of the Angami Nagas, which had become frequent and bloody—and now an assistant to the Commissioner of Assam, administers to the whole tract, including Toolaram's territory. Although undoubtedly a portion of the valley of Assam, I doubt if the transfer from the jurisdiction of Cachar was attended with much benefit, access from the latter place being so much easier, and the distance shorter, than that from the nearest station in Assam.

The deputation of an European officer specially to these hills has however been of the greatest advantage, as it has put a stop to blood-feuds and internal dissensions among the tribes, which were frequent under the old regime, and continued to be so till very lately.

At first a small police thannah was located at a Naga village called Hussung Hajoo, presided over by a darogah, who, under the Assistant Commissioner of Nowgong, had the whole charge of the district. Great irregularities and some oppression arose from this system. Nor was the peace of the country properly maintained, and although European officers used to make periodical tours through the hills, yet murders and affrays among the Nagas continued to take place even during their presence in the country. Moreover it was necessary that a larger body of troops should be located in the country, and, as offensive measures had ceased to be our policy towards the Angami Nagas, it was determined to take up a line of defence along the frontier.

For this purpose Lt. Bivar arrived in N. Cachar in 1851-52, and took up a position at Goomai-Goojoo, a small Naga village, on an isolated hill about 3,000 feet above the level of the sea. This station, a very fine one in most respects, was afterwards abandoned, owing to a scarcity of water, and to the fact that after Toolaram's

country had been annexed, it became no longer a central spot, and Apáloo, another Naga village, situated on some table ground, on one of the ridges of the Burrail, about twelve miles east of Goomai-Goojoo, was chosen as the sunder station of the district.

Apáloo lies about 2000 feet above the level of the sea, and is situated on a fine grassy ridge, having abundance of water close at hand. A gorge in the Burrail range to the south, however, opens directly upon it, and accordingly it is subject to the most constant and violent winds. Apáloo is on the southern border of the late Toolaram's country, being situated within a mile of the sources of the Mahour on its right bank.

About five miles to the south of Apáloo, rises one of the highest peaks of the Burrail. There is something very grand about this mountain when contemplated from the ridge on which Apáloo is situated. Resting on a very broad base, it rises at a small angle, and terminates in a point at the top, the whole expanse from summit to base almost being covered with luxuriant and variegated forest. The ascent on the northern side is gradual, but on the southern the declivity is almost perpendicular. This mountain is called "Mahá Deo," from which it may be imagined that bráhmanical superstition had something to say to its christening. I believe the ruins of a temple are still to be seen near the top, clearly indicating that at one time it must have been a place of religious resort to Hindus, although not now held sacred by them.

About twelve or sixteen miles north-west of Apáloo the valley of the Mahour river widens, and forms a basin, surrounded by hills, and densely overgrown with jungle.

During the reign of Gobind Chunder, the late Rájáh of Cachar, Tumroo Dhur, an uncle of his, was sent to North Cachar, for the purpose of building a city for the occasional habitation of the king. This spot called Maibung was the site chosen for the intended city, the building of which was duly commenced, but owing to the death of Tumroo Dhur was eventually abandoned. The place must be very unhealthy, being a low dell redolent of the malaria generated from rank and decaying vegetation. The remains of the unfinished city can now only be traced from some brick foundations evidently intended for a walled fortification, and one solitary temple

hewn out of solid sandstone of diminutive and ill-formed proportions. A few bél fruit trees, providently planted by the would-be founders, flourish, which, as the fruit is considered an infallible remedy for many diseases, would have been very useful to the inhabitants in such an unhealthy situation.

North Cachar, considering that it is a vast tract of rough irregular and intricate mountains, is nevertheless a productive country, and crops are raised on the hill sides, with very little more labour than what is required in cutting down the jungles.

Rice of course is the staple produce—the method of cultivation, I shall afterwards describe. The rice varies in quality, and some sorts are very inferior, others again are much better than the generality of rice grown in the plains. Cotton of a very excellent quality is grown by most of the inhabitants, and is perhaps the only article exported in great quantities. Besides these, the jooms are planted with common sorts of vegetables, such as byguns, kuddoos, cucumbers, &c.; tobacco, sugar-cane, Indian corn, and the castor-oil plant all grow well, and are cultivated, but to no great extent.

The chief natural productions of the country are bamboos and timber. Both of these are abundant, but can be turned to little or no use, owing to the difficulties of conveyance. Coal and limestone are known to exist in different parts of the district, but for the same reason are unavailable beyond their immediate neighbourhood. Salt wells are found in many places throughout North Cachar, but chiefly in the neighbourhood of a Cachari village called Semkur. Two gallons of the brine yield about a pound of salt, which is of tolerable quality, but prized only by the hill-people. Bees-wax is found in abundance among the rocky hills and in the forests, and is taken down for sale to the plains. Iron in small quantities is obtained from clay, and is manufactured by the inhabitants into spears and daos. Elephants abound in the jungles of Toolaram's country, and ivory might be procured in any quantity; but there are few hunters in those parts, consequently only a very little finds its way to the markets. Lac-dye of a good quality is found, and used by the inhabitants in dying, as is also wild indigo. A strong coarse silk cloth is made by

Cacharies from the silk of the eria-worm ; but the manufacture is not general among the tribes.

Edible fruits of different kinds are found in the jungles, but none are cultivated ; among them is the mango which grows to the size of a turkey's egg, possesses a fine flavour, and is free from the grubs, which make such attacks on that fruit in the plains. The peach also grows in a wild state, but never reaches maturity ; and wild plantains are common, but the inhabitants prefer eating the flower and the pith of the trunk to the mature fruit.

The Natural History of North Cachar is most diversified, and I am confident that the researches of any scientific zoologist would be attended with some important discoveries. I shall merely, without attention to classification, name some of the animals which are known to exist in the country.

I have seen the hoolook, or black ape, and their cry resounds through the forests ; there is another ape of a white colour, and two or three kinds of monkeys. I have also met with the "gher-minda billi," a sort of sloth.

The elephant, rhinoceros, and wild buffalo are common in the jungles and jheels to the north. The methin, or wild cow, is also indigenous and frequents the hilly jungles in the district, as do the sâmbre, spotted-deer, hog-deer, ravine-deer, and barking-deer. The antelope even is sometimes seen. Wild hogs and porcupines are common. Tigers, bears, leopards, and jungle-cats prevail throughout the whole country, and it is considered unsafe to go out at night by reason of them. The hyæna, wolf, jackal, fox, and wild dog, are to be met with in different localities—the jackal is, however, seldom seen in the hills. Civets and many kinds of ferrets and weasles abound. Flying squirrels and squirrels of several sorts inhabit the forests ; of the latter I have seen four distinct kinds, black, gray, brown and green. Bamboo or lion-rats, moles, muskrats, common rats and mice, are pestilently numerous, especially the three latter.

Alligators frequent the rivers, where they are large enough, to the north, and fish of numerous kinds, from those 80 or 100 lbs. in weight down to the smallest minnow, are caught in all the rivers. The rohoo and mäháseer, are the only kinds that I can distin-

guish. Prawns and crabs, also exist, as well as turtles and tortoises, some of very large size, and otters. I have seen frogs of many kinds including the flying-frog and the tree-frog. The gósámp, the armadillo, the chameleon and lizards of great variety both in size and colour are to be found in most parts.

Snakes of an infinite number of kinds, from the huge boa to those not larger than a small earth-worm, are found in the jungles—some of these possess great beauty, and I am certain many are not classified. Scorpions exist, but are scarce; centipedes are plentiful. Earth-worms, leeches, snails, slugs of several varieties, and caterpillars of every size and colour, are common.

Of birds, the vulture and kite are but rarely seen, nor are ravens and crows common. But eagles build their nests on the crags, and there are many species of hawks. I have seen no less than three kinds of toucans, and they are numerous. Peacocks and wild cocks crow throughout the country, and there are several kinds of pheasants, and partridges, pigeons and doves. Wild fowl, geese and ducks, teal and snipe, water-hens, &c. frequent the jheels to the north in their season, but are not found on the higher levels at any time. Jays and king-crows, parrots, parroquets and lutkuns are common, and their feathers are much prized as ornaments by the rude inhabitants; mangoe-birds, and many other kinds which I cannot distinguish, are to be met with in the woods; yet this is the department in Natural History in which North Cachar is most deficient. A day's journey may be travelled in the forests, without once hearing a note or seeing a bird.

Butterflies and moths of every colour and size abound, likewise insects of all sorts. Wasps, bees, beetles, bugs, fleas and lice are more than common. The blue-beetle, whose wings are considered so ornamental, is very plentiful. Flies, from the large wood-fly that makes a noise like a frog, including the dragon-fly, and the elephant-fly which draws blood by a bite, to the smallest gnat, are inconveniently abundant, as are mosquitoes and sand-flies—also pipsás.

The animals domesticated by the inhabitants are methins, buffaloes, cows, goats, and pigs, together with the common domestic fowl. Other animals have been brought up from the plains how-

ever, and thrive; among these are ponies, sheep, rabbits, geese, ducks, pigeons, &c.

I must not omit to remark a notion which prevails among the inhabitants of the country and more generally among those who have, comparatively speaking, recently become settlers, and that is, that there is something detrimental either in the climate or the locality to the proper generation, both of the human species, and of animals. As proofs of this fact they bring forward numerous instances of barrenness in women, and in domesticated animals, as well as miscarriages and production of abortions. I cannot pretend to account for this phenomenon, otherwise than, as regards the human species, from the fact that the women of the tribes forming the population of the country have ascribed to them the most laborious occupations both at home, and in the field; their duties do not even cease at times of advanced pregnancy, and this may give cause to part of the accusation brought against the district, but that part of the charge relating to barrenness, and the whole as applied to animals, remains unanswered.

North Cachar is not a country that pays! Extensive as the tract is, and fruitful and fertile though it be in a certain measure and considering that it is a mountainous country—yet the inhabitants are rude and unlettered, have little knowledge of commerce, and no wish or care to raise more produce than that which is required for their own consumption. The few articles that are exported are bartered for salt, and iron, and a few paltry ornaments, Manchester goods, even, not having found their way to a place so remote.

With the exception of a little ground in the plains to the north, there is no land settlement whatever in the district, each village cutting down jungles in its own vicinity and cultivating thereon. The villages are situated too far from one another to give rise to many disputes regarding the right of soil, and moreover there is a tacit understanding among them as to the right of possession of certain grounds. The only tax levied by Government is a house-tax, at the rate of one rupee per annum per house. The district is divided into different mouzahs, for each of which a mouzahdar is appointed, who is responsible for the collection of the revenue, and

receives a commission of 2 annas on each rupee collected, or $12\frac{1}{2}$ per cent. The gross revenue of the district does not exceed Rs. 8,500, and from this the commission has to be deducted. The revenue of the late Toolaram's country, recently annexed and included in the above, is about Rs. 1,800, out of which the surviving members of his family, who still reside at Mohoodunga, are pensioned to the extent of Rs. 1,000. The expense of administration, including the pay of the troops, &c. must exceed the receipts by about twenty times.

Having described, in rather a cursory and unconnected manner it must be confessed, the general character and state of the country, I next proceed to notice the inhabitants. No where is there a more extended field for the researches of the ethnologist than in North Cachar and its immediate neighbourhood, and the field still remains open, for I am not aware of any published account, wherein an attempt has been made to establish the cause of the astounding fact that at the present moment in the small portion of the world comprised in the valleys of the Barhampooter and Soorma, together with a few adjacent hills, there exist upwards of twenty distinct tribes, each speaking a language unintelligible to the other, and distinguished by manners and customs in which there is little in common, and yet it is plainly perceptible, from the cast of the countenance alone, marked as it is by the prominence of certain features, that most of these tribes have, at some time or other, been members of one and the same family.

Some cause, within a much more recent date, as mighty as that of Babel, must surely have produced such a superfluity of tongues and races. It is not for me, however, to attempt to divine such cause. I will merely endeavour, by recounting the experience I have had of the people of the district, to place material in the hands of those who, from their knowledge of the science, are better able to undertake the task, and bring it to a satisfactory issue. I have mentioned that North Cachar contains about 30,000 souls, and is divided amongst six different tribes. These tribes I will reduce to four distinct *nations*, which, for the most part, are subdivided and sub-subdivided into numerous clans and families, which remain apart from one another.

My four divisions are 1st, Cachárees; 2nd, Meekirs; 3rd, Nagas; 4th, Kookies.

1st, Cachárees. This nation is divided into two distinct clans, viz. the Hazai or plain Cacháree and the Purbuttia or hill Cacháree. The former of these, numbering in N. Cachar about 2,500 souls, forms the dominant class of the district, having formerly given Rájáhs to the whole of the country, having still a royal family of that line extant, being of the same clan as the late Toolaram, and being, by superior intelligence and education, raised above the other inhabitants. The Hazai Cachárees would appear to have been formerly possessed of the plains and kingdom of Cachar Proper; but they have gradually been driven northward. Many are still to be found in Cachar Proper, residing at the foot of the hills, and cultivating small patches of plain ground among the Teelahs; but by far the greater portion of them occupy the habitable portions of Toolaram's country and the lowlands on the river Dyung and Jamuuah. They have a language of their own, quite distinct from Assamese or Bengali, and differing from that of the hill Cachárees. In religion they are Hindus, evidently not primitive but proselyte ones, their superstitions and customs tending to anything but what would be considered orthodox by a bráhman of Benares. They eat pigs and fowls freely, sacrificing them also to their deities, and are likewise much given to opium and spirituous liquors. They have no distinction of castes among themselves, and may eat all together. There is, however, a distinctive hereditary title among them which meets with great consideration. I am at a loss to determine whether this be a religious or a civil distinction. The title, being that of "Burmon" affixed to the name, would lead one to infer that they derived it from their adopted religion, and that those so titled were nothing less than Cacháree bráhmans. But again no caste exists, and the Burmons are undoubtedly the aristocracy of the Cachárees.

The Hazai Cachárees, living in the lowlands are the only people in the district who cultivate with the plough, and pay a land-tax. They are a hardy, quiet and industrious people, and cultivate rice and cotton, finding a market for the latter down the river Dyung. While engaged in the primitive occupation of agriculture, they appear to be worthy

and honest. Not so, however, when under the light of a little education, having learned to read and write, they merge more into the world, and become acquainted with the practice of our courts. Such knowledge appears to develop the worst portions of their character, and they emulate the Bengali in chicanery and rival him in intrigue. Persevering and industrious, they work themselves up into places of consequence under us, in connexion with these hills, and use their influence for the furtherance of anything but good. Corrupt practices and oppression are much spoken of with regard to their administration, and all the mischief that has been done in the country may, in a measure, be attributed to the under-current of power possessed and exercised by them. The presence of a European officer is a great check upon them, and most necessary, as from among them are composed the chief omlah and police officials of the district.

In dress and ornaments neither the hill Cacháree nor the Hazai have much to distinguish them from the Assamese or Bengalis, except in remote parts, where the coarseness and scantiness of apparel and the rudeness of the ornaments are conspicuous. Their cloth is for the most part home made, and is strong and coarse. The Hazai also manufacture a coarse kind of silk from the Eria-worm, which the higher classes wear.

The Purbuttia or hill Cacháree seems to be the same individual as the Hazai, but ruder and more unsophisticated. His residence among remote hills and forests must necessarily infuse habits and peculiarities into his nature, which will make him differ from his brother in the plains both morally and physically, and such is the case. The baneful effects of that "little learning" which is characterised as so dangerous, is not felt here. The Purbuttias have no means of being educated, and they live among their hills in pristine ignorance and simplicity, alike free from the advantages and disadvantages of the approaching civilization which has reached the Hazai. Unacquainted with the use of opium, drinking spirits, but in no immoderate degree, constantly employed in the hard labour of their cultivation, and breathing the fine bracing air of the hills, the Purbuttias are physically much superior to the Hazai Cachárees and are a stout, strong, hardy and courageous race, very industrious, though rather inclined to be quarrelsome and turbulent.

The Nagas and other neighboring tribes hold them in great respect, owing to trials of strength in former days, when the Cachárees revenged themselves on the Nagas and took fearful retribution for injury done. In no case moreover, except one, have the Angami Nagas, who make fearful ravages into North Cachar and deal wholesale slaughter among the Meekirs and Nagas of the country, attacked a Cacháree village. And it is odd to remark, that this village of Cachárees, Semkur, is generally considered as an out-caste community, and is more assimilated to the Naga, than the Cacháree, many of the customs of the Semkur Cachárees being the same as those of the Nagas, and unpractised by Cachárees in general. This difference is supposed to arise from certain privileges, enjoyed by the Semkur people, under their old rulers, in connexion with the salt wells in the neighbourhood of their village. Their revenue being paid in salt, and their time chiefly occupied in manufacturing it, a difference of pursuits left the Semkur Cachárees much to themselves, and enabled them to enjoy less community with the others; thus they became less influenced by the general voice of the people and by popular fashion, as to changes in manners and customs, and, I think, we see in the Semkur Cachárees of to-day what the whole clan must have been many years back, and the similarity of this one village to the Nagas in many respects leads us to believe that the whole clan of Cachárees must have come originally from the Naga stock. Indeed some people go as far as to say that the Purbuttia Cachárees were coerced by the old Rájáhs of Cachar, into their present state of civilization, having been formerly Nagas, and that they were forced to adopt "dhoties" and the Hindu religion. How far this may be true I have no warrant for saying.

In religion the hill Cachárees are Hindus, but even more unorthodox than the Hazai, and retaining many more superstitions of their old faith, many of their observances being similar to those of the Nagas. They have not any castes among them, neither have they the distinctive title common to the Hazais. They look down upon their brethren of the plains, as weak and effeminate; and these latter do not fail to grind them when placed in power, and able to do so with impunity. Each family lives in a separate house, communities being formed into villages of between twenty and one hundred houses. The

young men of the village after they have attained a certain age, and before their marriage, no longer continue to live with their parents, but club together in a large house, placed generally in the centre of the village and called the "dekha chung" or warrior's house. This practice they have in common with the Nagas. The Purbuttias in N. Cachar number about 6,500 souls. They cultivate rice, cotton, sugar cane and tobacco, not with the plough, but by means of the hoe, and as theirs is a peculiar mode of cultivation, apparently common only to the hill tribes on their frontier, and practised by the Kookies and Nagas also, I will enter into a detailed account of it. I have already stated that the prevailing jungle in N. Cachar consists of a small single bamboo, which grows uniformly and closely together, the stems not being more than ten inches or a foot apart at their base, and reaching a height of thirty feet. This jungle extends all over the lower hills and the spurs from the high ones, and is only absent on the tops of the mountains and in some low grounds to the north. This wilderness of bamboo is the great cultivating ground of the district, and the process is thus managed. Early in the cold season large parties of the cultivators proceed to the jungles in the vicinity of their villages, and having selected a good patch, with as much soil on it as possible, commence cutting down the bamboos and clearing the space. The bamboos are cut off about two feet from the ground, the roots and stumps being allowed to remain in the soil: when sufficient space has been cleared, the cut-bamboos are left to rot and dry on the ground, and the effect of one or two showers, at intervals, coupled with the continued dryness of the cold season, renders them by the months of March and April almost as inflammable as gun-powder. Towards the end of the cold season, these fields of cut-bamboos, sometimes embracing the whole of a hill, at other times stretching along the whole face of ridges and valleys, are set on fire in various places. Nothing can exceed the fierceness of the conflagration, or the glorious effect produced by such large masses of flame, roaring and lapping the hills on all sides, and the enormous volumes of smoke that are emitted and hover like clouds in the air. The conflagration is over in a few hours, and leaves on the ground a coating of ashes about an inch or two in thickness, and this is the only manure

necessary to make these sterile hills yield fertile crops of almost any kind. By means of the hoe (a rude and uncouth instrument, consisting merely of a wooden handle about two feet in length, with a piece of iron attached to the end of it, something in the manner of an adze, only not on such a large scale) the soil lying below the ashes is turned up and mixed with them in the places between the stumps of the burned bamboos, which are still left to cumber the ground. Nor is the immunity enjoyed by these stumps, the effect of indolence or a desire to save labour at the expense of the crop on the part of the cultivators, but, on the contrary, an established custom, which experience has forced them to adopt, for these roots and stumps serve in a great measure to prevent the loose soil being washed away from the faces of the hills, and furthermore facilitate the re-growth of the jungle, when cultivation on the spot is abandoned. The soil being thus prepared, the seeds are dropped in, nor is care taken to allot to different vegetables, different spaces, but paddy, sugar-cane, tobacco and cotton are all found growing in the same beds. The harvest is reaped in September or October, sometimes even as late as November and December, and the ground may be again made to yield for another year or two, according to the custom of the cultivators or the richness of the soil. The Purbuttia Cachárees plant the same ground for two years at a time. When the land is considered exhausted, jungle is allowed to re-cover it, the bamboo again springs up in its old locality, and in the course of between seven and ten years, the soil is once more fit to be brought under cultivation. This is the only kind of culture practised in N. Cachar, and is common to all the tribes with very trifling variations. The Meekirs and old Kookies, as well as some of the new Kookies, cut down the forest in the low lands as well as bamboo jungle, and put it through the same process, cultivating on the same spot for four or five years, but forest-cutting is more laborious than bamboo-cutting, and the trees take thirty or forty years to grow up again when the ground is abandoned.

2nd, Meekirs.—Of this tribe the tradition is as follows. They were originally settled in Toolaram's country, under chiefs of their own. Being conquered by the Rájáh of Cachar, they fled to Jynteah for protection, and meeting with great oppression from that state,

they emigrated to their present localities in Assam and N. Cachar, and placed themselves under the Rájáhs of Assam, who appointed a chief over the whole clan, granted them lands and exacted revenue. This tribe is, I believe, subdivided much in the same way as the Cachárees, and has two distinct sections, namely, the Hill Meekirs and the Plain Meekirs. The latter reside chiefly out of North Cachar, in the district of Nowgong, on some low lands which go by the name of Meekir Par. These people, though industrious and hard-working, never rise to office like the Hazai, and seem to be devoid of all ambition. The Hill Meekirs are to the Plain Meekirs, much as the Purbuttia is to the Hazai Cacháree. Although placed in exactly similar circumstances to the Hill Cacháree, they display none of his courage, and seem wholly wanting in martial spirit. In consequence of this, they are made the constant prey of the marauding Kutcha and Angami Nagas, who attack their villages, kill, spoil and carry into captivity, no resistance being offered. It is said, that long ago an attempt having been made by the Meekirs to throw off the yoke of Assam, and failing, they were made to foreswear the use of arms, which may be the cause of the cowardice of the present generation, who, although they do carry spear and dhaos, never make use of them save for the purposes of cultivation and wood-cutting.

The Meekirs are in many respects very like the Cossiahs, which fact may arise from their having for some time sojourned in Jynteah, and perhaps received some admixture of Cossiah blood. They wear the same kind of dress, which is peculiar and not worn by any of the other tribes in N. Cachar. This consists of two pieces of cotton cloth, about eight feet by one and a half each, dyed with red stripes, and fringed at both ends, sewn together like a bag, apertures being left for the head and arms, and put on in the manner of a shirt.

A striking resemblance also exists in the cast of countenance, and the growth of hair upon it being confined to the upper lip. But the Meekirs are physically a much inferior race to the Cossiahs, possessing neither such large frames nor such development of muscle.

Their locality in N. Cachar, is to the west and north in Toolaram's country.

The Meekirs though cowardly are laborious and persevering, and are considered the best subjects in N. Cachar, keeping clear of

courts, paying revenue regularly, and working hard at their vocation as cultivators. They rear rice and cotton in abundance, disposing of the latter to Cossiahs and to merchants who come up the Dyung.

When not employed in agriculture they fell large trees, construct canoes, and float them down to market in Assam, realizing considerable profit by this manufacture. The labour of their cultivation is greater than that of the other tribes, as bamboo jungle is scarce in their locality, and they are necessitated to clear forest land.

The Meekirs build their homes on high muchans or platforms, supported on posts, several feet from the ground. One timber laid slanting against the platform, with notches cut upon it, serves as a ladder to enter the house ; this may be withdrawn at pleasure, as a guard against wild beasts. The houses are generally very large, several families at times living in the same tenement in order to avoid payment of the house-tax. The house, however many may be living in it, is not divided into rooms, but men, women and children of different families to the number of thirty or forty sleep altogether in the same apartment, in a state of almost entire nudity.

The Meekirs have no regular religion, many of them, especially those in Assam, have been converted to Hinduism, but they are allowed by their priests to retain most of their former superstitions and customs, and are only enjoined to discard the use of spirits, in lieu of which they take to the much more demoralizing vice of eating opium. The unconverted Meekirs delight in grog, and take it to excess, most of their ceremonies being celebrated by drunken orgies. But they are peaceful in their cups, and disturbances seldom or never occur. The Meekirs eat pigs and goats as well as fowls, and in fact all animals, but they refrain from killing the cow, more from prudential than religious motives. They worship the sun and moon, and large rocks and trees in the forest, which they consider the abiding places of unknown and invisible deities, to whom they offer boiled rice, fowls, goats, and pigs as sacrifices. There is no religious ceremony connected with marriage among this tribe. A bargain is made and a contract entered into, and man and woman are husband and wife. Polygamy is discountenanced though practised. A feast is always given in commemoration of a marriage, and likewise on the birth of a child.

Feasts before and after the funeral are the only obsequies, the bodies of the dead being burned, and their ashes buried.

The number of Meekirs in N. Cachar is difficult to be ascertained, as it cannot be correctly calculated from the number of houses. It is supposed to be, however, about 4000 souls.

3rd, Nagas.—There are about a dozen different tribes, each possessing some marked peculiarity and speaking distinct languages, to whom this common appellation is given. Indeed, the natives of the plains apply it promiscuously to all the hill tribes on the frontier, and as the word is their own, and unused among the hill people themselves, they have every right to do so; Naga, it would appear, being a corruption of "Nunga," naked, and very properly applied to those who go about with such scant clothing. Some say, however, that it is derived from the Sanskrit word "nag," a snake, having reference to the subtle and treacherous character of the people. In N. Cachar, there is, however, only one tribe, who call themselves Aroong Nagas. These number throughout the district about 7500 souls, and build their villages, which consist generally of from between twenty to one hundred houses, on the tops of hills and on the crests of ridges running out from the Burrail on much higher levels than those occupied by any of the other inhabitants of the country. They seem also more attached to the sites of their habitations than the rest of the tribes in those parts. Cacharies and Meekirs fit to other locations on slight pretexts; the fear of an attack, or a quarrel with a neighbouring village will make them change their sites; and on the exhaustion of all the soil in their immediate vicinity, it is their custom to remove nearer to the new jungles which it is their intention to clear: the Kookie also is a migratory animal, and never remains more than three or four years at the same place. But nothing short of the direst necessity will force the Nagas of these hills to relinquish their native spot of ground. Sometimes indeed they are obliged to do so, when placed in exposed situations, and constantly subject to attacks from parties at enmity with them, whom they cannot resist; at the present moment I know of a village site, in the neighbourhood of the Angami frontier which has been abandoned owing to the repeated attacks which had been made on the villagers while there resident. The Nagas who occupied

that site have come into the more central parts of the district, and have allied themselves with other friendly villages; but on greater security being afforded them, they would to a man return and rebuild their old village. When the soil near their homes is exhausted, they proceed to great distances to cultivate, little heeding the labour of conveying back their harvests; and for a people who appear so lazy and idle as the Nagas (the casual visitor generally finding them sitting lolling at their doors, drinking grog) it is really wonderful to see the sacrifices they make to this love of certain localities. Their villages being placed on heights in most cases, water is not to be had any where near, yet they do not murmur at having to convey it on their backs from the very bottoms of the adjacent valleys, five or six hundred feet in perpendicular ascent, and perhaps as much as a mile in distance. At such villages, strings of women, laden with the necessary element contained in long bamboo choongas, are seen making the weary journey morning and evening. From this attachment to particular sites and to the country in general, I think it may be inferred that the Nagas are the earliest inhabitants of the soil. I leave it to others to find out where they came from. But if the question be to draw a line of distinction, between the aborigines of India, and those tribes who have emigrated into it from the east, I would draw that line here, and place the Nagas, although they may have some marks of a Tartar origin about them, as the rudest of the aborigines of Hindustan—whereas the Cossiahs, Meekirs, Kookies, Monipuries and Looshais, and many others are directly connected with the far east. The three latter, having approached their present localities from the south, may possibly have been crossed with the Malay: for the Cossiahs and Meekirs, who were undoubtedly earlier immigrants than either of these three, retain the peculiarities of the Tartar countenance far more distinctly than they do.

The Nagas have no kind of internal government: they acknowledge no king among themselves, and deride the idea of such a personage among others. When questioned, they proudly plant their spears in the ground, and pointing at them, declare they have no other Rájáh. They appoint as spokesman of the village some elder who has the reputation of superior wisdom, or perhaps more

frequently the influence of wealth, and his position as spokesman or "Gáon Búra" gives him a certain degree of authority; but this is very moderate indeed, and may at any time be resisted and defied with impunity, the tribe utterly abjuring the idea of subjection to any one from among themselves. The place of Gáon Búra is not hereditary, nor, in every case, is it held for life. Petty disputes and disagreements about property, are settled by a council of elders, the litigants voluntarily submitting to their arbitration. But correctly speaking, there is not the shadow of a constituted authority in the Naga community, and, wonderful as it may seem, this want of government does not lead to any marked degree of anarchy and confusion; on the contrary, in his village, the Naga is peaceful and hospitable, good-natured and honest; for months that I have lived with him, I never heard him use an angry word or inflict a blow, however slight, on any one. Such a state of things must most assuredly arise from some peculiar cause, which cannot elsewhere be adopted, otherwise what an advantage it would be to us to throw off the whole of that ponderous and expensive system which is concentrated in Westminster, and branches forth to every colony, country and village throughout our possessions, and, taking a lesson from the Nagas, learn to live peaceably and honestly without law. But our civilization and christianity deprives us of the mainspring which acts so apparently well on the savage of the hills, and God forbid, that it should not. The Naga's religion, the Naga's principle and sense of honor, is comprised in one word, and that word is revenge—deep deadly revenge, and the prosecution of it to the extremest lengths, for the most trifling offences. This feeling is not confined to individuals, but taken up between communities, and often by parties in one and the same community. Is there a quarrel between two Nagas of different villages, the dispute inevitably causes bloodshed, and a feud is established between the villages of the two disputants, which nothing will assuage, and which, in time as advantage offers, will find issue in some dreadful massacre. The Nagas are exceedingly treacherous in enmity, and brook no insult. An insult given, it is a point of honor to have blood—and blood shed by the one party calls for a like stream on the part of the other.

When any difference occurs between two men of the same village, which is rarely the case, each individual has his party who cling to him and take up his quarrel, not by any means from a sense of justice, but from relationship—and a civil war ensues which it is disgusting to contemplate. It is not to be wondered at, then, with such evils before them, evils which are brought home to every member of the society, that the Nagas are so careful to curb their passions on small matters, and to avoid entrance into a quarrel, when, being in, they carry it out to such exterminating lengths: and therefore, anomalous as it may seem, the most baneful passion that arises in the heart of man carried to extremity is the cause, in this instance, of the existence of a society without laws and constituted authority living in general peace and honesty. I do not think this state of things is without precedent, even in the history of our own country. If we take into consideration the state of the Highlands of Scotland some one hundred and fifty years ago, I think, we shall find many points in which great similarity exists. There, though subjected to chieftains, the clans were left with very little more law, than that which each man carried at his side in the shape of a broad sword. There again the spirit of revenge was paramount in every breast. The fiery Celt could brook no insult, and feuds between clans espousing the cause of individuals were frequent and bloody. Yet no circumstance of internal anarchy marked those lawless days. Society was not outraged, and the different communities were among themselves peaceful, hospitable and neighbourly, rigidly avoiding all cause of quarrel, being sufficiently urged to curb their temper, by dread of the consequences which would ensue, from no other agent, but unmitigated revenge.

Notwithstanding the staidness in the Naga character, arising from the circumstances mentioned, they do, at certain seasons, find vent for the indulgence of private grudges that they owe to individuals among themselves, in a way at once harmless and ludicrous. At certain stated times, once or twice in the course of a year, all the village adjourns to some convenient spot, and a general *mélée* takes place, every one fighting for his own band, but using no weapons save those with which nature has provided him. These conflicts are very fierce, and the bruises and scratches given and received

most severe ; yet they are not taken into account and never give ground for a quarrel, whereas at other times the lifting of a hand would lead to a blood-feud.

Since the regular establishment of our government in these hills, many feuds have been patched up among the Nagas, and their recurrence is less frequent ; the presence of an European officer on the spot, who can expostulate with, and explain our policy to, the most influential people of the tribes, has also materially tended to check the effusion of blood. But still they do occur, now and then, and nothing will eradicate the evil spirit, until many years have passed away, and a brighter light shines among the rude inhabitants of N. Cachar.

The Nagas have a very vague idea of religion. They admit a plurality of deities having different attributes, but have none to whom they ascribe creation, the universe being pre-existent to their gods, and remaining unaccounted for. The first person in their mythology is "Semeo" the god of riches, to whom all those who seek wealth make sacrifices. He is also supposed to inflict punishment in the way of sudden reverses of fortune and sickness, on those who, having wealth, do not sacrifice to him. "Kuchimpai" is the god of the harvest, as well as one possessing general influence over the affairs of mortals. To him sacrifices are made of goats, fowls and eggs (the large animals such as buffaloes, methins and cows, being reserved for Semeo) and prayers offered up for the prosperity of the crop. Among the malignant deities "Rupiába" has the first place ; to his displeasure are ascribed all the misfortunes that fall to the lot of mortals, and offerings of dogs and pigs are made to appease him when angry. He is supposed to be of a very fierce and ungainly appearance, and has only one eye, and that in the middle of his forehead. As an assistant Rupiába has got a blind god of the name of "Kangniba," whose temper is fierce. He is worshipped at cross roads, where propitiatory offerings are piled up for his benefit by passers-by. The fact of his being blind is wickedly taken advantage of by the Nagas, and offerings made to him seldom consist of more than a few common leaves, he being supposed to be unable to distinguish between them and articles of greater value. When fowls are sacrificed to this god, a very *small* fowl indeed is

selected, and placed in a *large* basket at the appropriate place.. The blind god *feeling* the size of the basket, takes it for granted that the contents are commensurately bulky, and deals his favours accordingly! Indeed, Naga worship is none of the most sincere, even as regards the animals that are sacrificed to the wide-awake deities ; little more than the entrails and offal is apportioned to the god, the remainder going down the ungodly throats of the petitioners !

Omens are commonly consulted, and are supposed to indicate the particular deity that is to be worshipped in order to attain a desired end or avert evil. This being ascertained, the village is strictly closed for two days, the inhabitants abstaining from all labor, and neither going out themselves nor permitting any one to enter during that period. This custom is strictly kept, and called "Genna;" it is difficult to find out what is done during this interval of seclusion ; but nothing further, I am inclined to think, than sacrificing, eating and drinking. Before burning newly felled patches of jungle for cultivation, it is the invariable custom to establish a Genna. On this occasion all the fires in the village are extinguished, and a cow or buffaloe being slain, they roast it with fire freshly kindled by means of rubbing together two dry pieces of wood, make sacrifice and eat, after which they proceed in procession with torches lit from the fresh fire to ignite the felled jungle.

The Nagas cultivate rice, cotton, and tobacco as well as the more common Indian vegetables, such as yams, bygums, kuddoos, cucumbers, Indian-corn, &c. Their mode of cultivation is exactly similar to that described with reference to the Purbuttia Cacháries ; but they take more crops off the ground than any of the other tribes who cut bamboo-jungle, owing to their distaste to remove to other sites, when the ground near at hand is exhausted. Perhaps it is on account of this, the soil being overtaxed, that both the rice and the cotton grown by the Nagas is inferior to those produced by the Kookies and Meekirs.

The Naga houses are built after a peculiar fashion, having the eaves down to the very ground. One gable end, the front entrance, is considerably elevated, while that to the rear slants down almost to the earth. The floors are not raised on platforms. The houses contain two rooms, the inner reserved as a sleeping apartment, while the outer serves for

the domestic business and the residence of the pigs and fowls belonging to the family. The village is generally built in one irregular street, the entrance with gables facing the road, but sometimes the houses are thrown together without reference to order at all. Each family lives in a separate house; and the young men or "Dekhas" inhabit a large hut appropriated to themselves, in which are hung up the spoils of the chase and the implements of war, and which forms at the same time the caravansarai or inn of the village.

The Nagas attach great value to iron, and use it only in the manufacture of weapons, their cooking utensils being invariably made of wood, bamboo or clay. They manufacture dhaos, spears, hatchets and hoes, there being generally in each village an individual who officiates as blacksmith.

Two or three kinds of cloth are manufactured by the Nagas, among which are the coarse khés which they use as a covering, and a small piece of cloth of different texture, dyed with indigo, which they tie round their waists. The cloth used in dancing is the same as the white khés, but has small triangles at regular intervals woven into it with red and blue thread, and also fringes at each end made of the same, which give it a gay appearance.

This tribe is passionately fond of ornaments, and both males and females may be said to load themselves with them; many of these are manufactured at home, but they consist for the most part of nothing but brass-wire, an article much prized by the Nagas, and shells, or cowries, which are imported. One of their ornaments, an armlet, is peculiar to themselves, although it has been adopted by the Kookies since their arrival in the country. It consists of a rod of brass, twisted some eight or ten times in the shape of a wire-spring, and slipped on the arm, fitting tightly to the flesh between the shoulder and the elbow, and being most inconvenient, I should say, for the exercise of the arm. There is only one stone to which the Nagas attach any value. I have never been able to find out its name; it is a dirty, yellowish, almost greenish looking opaque stone, and is cut by them into cylindrical beads, and worn, stringed together, round the neck. Few among them are rich enough to have a complete necklace of such beads, but most of them will be seen to have as many as five or six of this kind strung on in company with others,

and some may have half a necklace of the precious stone. In dancing, both men and women wear heaps of ornaments chiefly composed of shells. With the exception of a little cloth, tied round the waist, the end of which hangs over in front and covers the private parts, the Nagas go quite naked, nor do they feel any shame at the exposure of members which civilization requires to be concealed. The women, wear a wrapper over their thighs which extends from below the navel to the knee. Married women leave their bosoms uncovered, but virgins have another cloth tightly tied round their breasts. Both sexes protect themselves from the cold by a loose cloth thrown over their bodies like a blanket. Neither the men nor women wear any sort of head dress. The women who are married wear long hair plaited, and knotted at the back, or sometimes flowing naturally over the shoulders. The unmarried women have their hair cut off their face in a square fashion, and brushed down upon the forehead, nearly to the eyebrows. The men cut their hair short (shaving a little at the forehead and sides) and train it to stand erect. As a general rule there is not the slightest appearance of hair, either on cheek, chin or upper lip, and a good long beard is always an object of curiosity to the Nagas, when met with in others. The Nagas, both men and women, bore their ears but not their noses, their earrings chiefly consist of brass-wire rings. But they are very fond of flowers and often place them in their ears, so also will they place any coloured piece of paper or cloth, and the blue beetle wing or even a blade or two of green grass or leaves.

Marriage among them is a simple contract entered into between the man and woman or their families; the family of the bride being presented with cows, pigs, fowls or drink according to the means of the other party. There is no ceremony performed except the giving of a grand feast to the whole village, who in return build a house for the newly married couple. In some cases a long betrothal precedes the marriage, but no positive necessity exists for this custom, and it can always be dispensed with. The Nagas are not permitted to marry, until they have attained a certain age, and are able to set up house on their own account.

In his choice of a helpmate neither the beauty of form nor face is much taken into consideration by the bridegroom, physical strength

and industry being the great desiderata in a wife, the former giving promise of numerous offspring, and both being indispensable to one who is, unassisted, to perform all the menial duties of a household, as well as give assistance in the field. The Naga woman is quite a model of labour and industry. At all hours of the day she may be seen busily employed in domestic duties, weaving cloth, pounding rice, washing clothes, carrying water, making grog, or tending children, while her husband and the men generally lie idly basking in the sun, deeming it effeminate to put their hands to any work save the cultivation of their fields, or the repairing of their houses.

The Nagas bury their dead at the very doors of their houses, in a coffin formed of the hollow trunk of a tree: after filling in the earth, a large stone is rolled over the top of the grave to mark the spot, and the streets of most Naga villages are consequently choke full of these rough unhewn tombstones, marking the resting-places of their forefathers. Perhaps the idea of living thus in the neighbourhood of their ancestors may be one cause of their attachment to the sites of their villages. They display great affection in tending the graves of the recently departed; the spot is at first invariably fenced in, and flowers are often scattered over it, and the survivors love to sit upon the stone that covers those once so dear to them. When a warrior dies, his spear and dhaos are buried with him, and it is the custom to bury with every one any article to which he or she may have been particularly attached during life. I have never heard of avarice invading the sanctity of the tomb in consequence of this custom, although dhaos and spears are greatly prized by the tribe.

The Nagas are extremely fond of dancing, more so than any of the other tribes, whom also they excel in the exercise. Men and women dance both together and separately. The men have a war-dance with spears and hatchets, in which all the circumstances of battle are acted, the advance, the retreat, the wielding of weapons, and defence with the shield, accompanied by terrific howls and war whoops, which has, when well enacted, a very imposing effect. The dance in which the men and women unite, seems to be purposeless and monotonous, displaying neither grace nor agility, and so are some of the dances danced by the women alone, one of

these is, however, a very lively one, and resembles in some degree the Highland Fling. It is easily seen that the women are the chief dancers, and those who take most interest in the exercise. A very poor idea of music exists among the Nagas, and it is never practised except in dancing, where it serves to mark the time; a rude monotonous song is chaunted by the whole company, and eked out with the clapping of hands both on the part of the dancers and the spectators. The performers, being laden with massive necklaces, armlets and bracelets, make these ornaments chink in time to the step, and a drum is also in some instances beaten in accompaniment.

The Naga cry or war-whoop is not a sound to be described in words, being something fearfully shrill and long continued, yelled with variations. But the custom among them called "hoo-hoo-ing" is easier of description; this is a common way among this tribe of paying honour to any individual, or to the inhabitants of any other village that they may happen to visit, and it is always supposed to call forth a donation from the party honoured. Parties of from ten to fifty take up the cry in chorus, which consists of nothing but the sounds of "hoi and hou" uttered alternately with the full force of the lungs, for about an hundred times, and finished off with a "howh" a harsher prolongation of the "hou." When one village compliments another in this way, they are very careful to exact a certain value for the compliment paid, and quarrels have been known to arise, when the compensation was not thought sufficient.

The Cachárees of Sunkur, alone, of all the other tribes in the country, have this custom in common with the Nagas.

In carrying burdens the Nagas in respiring utter a sound like "hu ho," and when a number are on the road together a chorus is maintained. This custom is practised by all the tribes with slight variations, but it must not be confounded with the "hoo-hoo-ing" described above, which is strictly peculiar to the Nagas. For an inhabitant of the hills the Naga is very cleanly in body, washing himself pretty freely whenever he can come across a sufficiency of water. But his clothes, except when new, are very filthy, and filled with vermin. As regards eating, he is the most indiscriminate animal in creation. His staple food is of coarse rice, but his luxury consists in flesh. I do not know a single living creature of any kind which he will not eat,

and that too whether it dies a natural or a legitimate death, and however far the body may have advanced towards decomposition. Insects, reptiles, carrion animals, as well as those in general use for food are eagerly sought after by him. He eats frogs, lizards, snakes, rats, dogs, monkeys, cats, &c. with relish, and will pick them up for that purpose though found dead and half rotten in the jungles. It is not to be wondered at, that there are no jackals or vultures to be found in the hills of North Cachar; what would they do if subjected to such competition?

The Nagas make a fermented liquor from pounded rice, which they drink in great quantities, especially in the morning, when it serves them as breakfast, being of tolerable consistency. It is not very intoxicating, and has an acrid disagreeable taste. The Nagas smoke very little, and when they do, it is more for the purpose of obtaining the tobacco oil in the bottoms of their pipes, than from the enjoyment of the vapour. This oil they mix with water and drink it, and they also drink water in which the tobacco leaf has been pressed. Tobacco is also chewed by them in great quantities.

4th, Kookies.—These, in North Cachar, are divided into two distinct sects, which sects are again divided into a number of clans; all these clans, though coming from the same stock and speaking dialects of the same language, are still entirely separated in interests, having frequently in bygone times waged war with one another, and having manners and customs widely different from each other. The sects are distinguished from one another by being termed old and new, there being no distinctive appellation among themselves except for the clans.

The old Kookies, with a population of not more than 3,500 individuals, are divided into three clans, called Rhángkól, Khélma, and Betéh, of which the most considerable is Rhángkól. These clans speak dialects differing very much from each other, and the whole differ so much from those spoken by the various tribes of new Kookies, that in most cases individuals of the two sects cannot make themselves understood by each other at all. On one occasion of some necessity I remarked a very intelligent new Kookie, endeavouring to explain himself to one of the Khélma clan, and failing entirely to do so by the simple power of words, being

obliged to eke out his communication by signs, by means of which his purpose might have been equally well made known, had he been an Englishman. Not only do the clans and, more widely, the sects differ in dialect, but their manners and customs, government and ceremonies, and with respect to the sects their religion also, is not the same. I can divine no cause for such a state of things ; and the matter becomes still more inexplicable when it is known that these are not *all* the tribes of Kookies extant. The Looshais, a large tribe inhabiting the jungles south of Cachar, by whom the clans of new Kookies were driven northward, are themselves, undoubtedly, of the same family, and speak a language quite intelligible to the new Kookies. The Manipoories, a nation of proselyte Hindus, governing an immense tract of mountainous country to the east of Cachar, and inhabiting a large basin of plain ground among the hills, called the valley of Manipoor, can be traced by their own written history to a Kookie origin ; and were this proof wanting it would be easy to supply one by pointing to the similarity of the Manipoorie and Kookie languages, or rather dialects, any new Kookie being able to understand Manipoorie without much difficulty, and indeed, the languages being almost identical.

The old Kookies emigrated from the jungles of Tipperah, the hilly country south of Cachar, some fifty or sixty years ago. Their first appearance in Cachar, in a state of almost perfect nudity, appears to have shocked the inhabitants very much, and they were compelled by the rulers to adopt clothing, which they did, and do to the present day. Some years after their arrival they were made available by the Rájáh of Cachár in prosecuting his wars with Toolaram, in which they distinguished themselves considerably, and gained a name for martial courage, which together with their good-natured dispositions, has established a general respect for them in the minds of their neighbours, the Nagas and Meekirs.

They are a hardy, stalwart and pains-taking race, and together with the Meekirs are considered the best subjects in Northern Cachar, being peaceable, and regular in the payment of their rents. Their position in the district lies along the western boundary along the banks of the Copilee, where they cut down the timber forests, and raise crops of rice and cotton, disposing of the latter, which is of the best

quality grown in the country, to Cossiah traders who come among them to obtain it. The old Kookies are physically a more powerful people than any other in Cachar, and are second only to the Cossiah and Angami Nagas, of any tribes that I have seen, in weight and muscle. They are larger men than the new Kookies, both as to height and girth.

They make the best laborers or coolies, both for working and carrying, to be had in North Cachar, entering on their work more cheerfully, and performing more. In common with all other hill tribes they carry burdens in a large cylindrical basket, attached to the back by a strap of matted cane work which passes round the forehead, and is occasionally slipped down to the chest for change or relief. The regulation burden for coolies in North Cachar is twenty seers, the hire being two annas a day per man: but, when engaged in carrying on their own account, they do not hesitate to load themselves to the extent of a maund, and seem to be very little inconvenienced by the weight, even when travelling long journeys over the most irregular ground.

These remarks apply generally to all the tribes in the hills, who are all wonderfully long-winded, sure-footed, and strong-backed.

The old Kookies clothe themselves decently and affect a modesty unknown to the other rude tribes of these hills. They weave cloths of different kinds, all bearing great similarity to those manufactured by the new Kookies, especially a sort of cotton rug which they make as a covering in cold weather; this consists of uniformly sized lumps of raw cotton woven into a coarse-textured cloth, and knotted tightly between the woofs, forming an excellent soft and elastic mattress, as well as a good counterpane. They are also very skilful in mat and basket making, with bamboos, cane, and the bark of trees.

Like all other hill tribes the old Kookies are very fond of ornaments, and wear rings, bracelets, armlets, necklaces and earrings in great numbers. They have an extraordinary custom in common with two clans of the new Kookies, which being peculiar to these people is worthy of description: instead of merely boring the ear with a small hole, they cut a circular piece of flesh out of the lower lobe, and insert an elastic shaving of bamboo, rolled up in a ring, so as to form a powerful spring acting on all sides of the incision. By means of this spring, the hole is gradually enlarged,

until it is made to reach enormous dimensions, the outer flesh and skin of the lobe being sufficiently stretched out to admit of a brass or silver ring, four or five inches in circumference, being inserted within the hole. The ear is also turned round, so as to make the earring lie at right angles to the side of the head, and through the ear and ring are again attached other ornaments hanging down from it.

There is no regular system of government among the old Kookies, and they have no hereditary chiefs, as is the case with the new ones.

A head-man called the Ghalim is appointed by themselves over each village; but he is much more of a priest than a potentate, and his temporal power is much limited. Internal administration among them always takes a provisional form. When any party considers himself aggrieved, he makes an appeal to the elders, or the most powerful house-holders in the village, by inviting them to dinner, and plying them with victuals and wine. These personages having listened to the grievance form a council, and summon the defendant, who cannot resist their process, and attends. If found guilty he is fined according to the nature of his crime, one fourth of the sum being retained by the council as a personal remuneration, and the remainder being made over to the plaintiff as compensation. Of course this iniquitous system of redressing wrongs, would not stand good, if an appeal were made to our courts, but such is the attachment of the people to their own institutions that no such appeals are made. It is lucky that the establishment of our law, has left to this council little more than jurisdiction over domestic crimes and immoralities; thefts, assaults, and all the more heinous offences being tried before the magistrate. The council, however, is convened in cases of adultery, seduction, evil speaking, &c. and doubtless still makes good profits.

Very vague notions of religion indeed are prevalent among these people. All earthly evils are ascribed to the anger of gods, or the pleasure of demons, petitions being made and sacrifices offered up to both to propitiate them. They believe in a futurity of rewards and punishments in acknowledgment of the good or evil actions of this life, but cannot grasp the idea of eternity.

Marriage among them appears to be as much a religious as a civil ceremony, the Ghalim being the officiating priest. The young

couple place a foot each upon a large stone in the centre of the village, and the Ghalim sprinkles them with water, and pronounces an exhortation to general virtue and conjugal fidelity, together with a blessing, and the expression of hopes regarding numerous progeny. A grand feast concludes the ceremony. Notwithstanding the religious nature of the rite, however, a man cannot get his wife without paying for her, and the average price of a helpmate is Rs. 30, in kind, or coin paid into the hands of her parents.

Should the money or goods not be forthcoming, and the power of the little god very strong withal, the bride may still be won, the lover undertaking to enter into bondage in the house of her parents for a term not exceeding three years, after which the ceremony duly takes place. The business of courtship seems to be well understood and delicately managed among the old Kookies. As soon as a young man has made his attentions sufficiently marked, he sends a friend to the parents of the young lady of his choice, with a stoup of liquor to present to them: if the wine be quaffed the proposed alliance is accepted, and the lover summoned to enter into preliminaries. But if the offered cup be declined, the gentleman must go elsewhere in search of a bride.

Polygamy is interdicted and never practised.

Widows and widowers may marry a second time, after having remained in their bereaved state for a space of three years, and not then, unless with permission of the family of their late spouses. This permission is often withheld, and large bribes are frequently exacted before giving it.

The old Kookies burn their dead. The body is placed upon the pyre together with different kinds of eatables, and the whole is consumed, the ashes are then addressed by the friends of the deceased, and his good qualities recited. A feast with plenty of good liquor concludes the obsequies.

A married man is accompanied to the pyre by his widow, who has for the occasion donned her best clothes, and put on all her ornaments; she walks by the side of the bier with one hand on the person of her husband. When the body has been consumed, she bursts into loud lamentations, affectionately takes leave of the ashes, throws aside her ornaments and walks home with dishevelled hair.

In the Betéh clan on the day after cremation a pointed stick is stuck into the ground opposite the house of the dead man, and remains there until every one of the villagers has, in pursuit of his common avocations, passed by and spat upon it, after which it is removed.

A warrior in the Betéh clan is generally buried, and not burned ; he is dressed in new clothes, and descends to the grave in company with his spear and hatchet, and a supply of eatables and grog, it being supposed that his enemies will not leave him alone, even in the world to come.

The original country of the new Kookies was the jungles to the south of Cachar Proper, and the ranges of hills lying between that province and Chittagong. Here they had lived time out of mind, waging war frequently among themselves, and being known as the terror of our Southern Frontier, having committed frequent depredations in our territories, evidently for no other purpose than that of securing human heads as trophies.

A war, however, sprang up between the whole of the clans, and another large tribe called the Looshais, who inhabited the same country though removed further south ; this tribe having the advantage of propinquity to a coast-trade had supplied themselves plentifully with fire-arms and consequently the Kookies, who had heretofore considered themselves more powerful, were defeated, and in 1848-49 four large clans of them called the Thadon, Shingshón, Chúngsen and Lumgúm, together with other petty though distinct families, poured themselves into Cachar, flying before their enemies the Looshais, who had driven them from their native hills into the plains. The Looshais having followed up the pursuit into our territories and ravaged some villages on our grounds, it was determined that an expedition should be made against them on the part of our Government. Col. Lister with three hundred men of the Sylhet Light Infantry Battalion, accompanied by a rabble of the Thadon and Shingsón clans, penetrated some seven days' march into their country in the cold weather of 1849-50, and succeeded in setting fire to a large village consisting of a thousand houses. The village was taken by surprise, and the warriors all escaped, most of them being absent at the time, but nothing could prevent our wild

allies glutting their revenge on those that were at home. Colonel Lister, finding the enemy in greater numbers than he expected, and the country most intricate, and one in which an enemy conversant with it might give great annoyance by laying ambuscades and making sudden attacks, resolved to prosecute the expedition no further, and returned forthwith to Cachar; not, however, without meeting some slight opposition from the Looshais, who in more than one place had commenced stockading positions on the line of march, so as to obstruct the passage of our troops. Nothing further was done with reference to the Looshais, they having declared that they had no intention to molest us, their quarrel being with the Kookie clans alone.

It remained then only to settle the Kookies, whom the force of circumstances, and the chances of war had driven to our territory for protection.

This appeared no difficult matter to do; most of them had already settled on the woody hillocks near the river Goghra, and on the hills to the north, while many had penetrated into North Cachar and Manipur. But there still remained a large number of the clans of Thadon and Shingshón, those most recently expelled by the Looshais, who hankered for revenge, and were unsettled and turbulent. These, if left alone not being in themselves strong enough to continue openly at war with the Looshais, would have occupied themselves in making secret excursions with a few men at a time, and cutting off strong parties of the enemy when at work in their fields or wood-cutting, who in their turn would have retaliated, thus plunging the whole of the frontier into an endless little war of the most pitiless kind.

To prevent this, at Colonel Lister's suggestion, a levy of two hundred men was organized, consisting chiefly of Thadons and Shingshóns, officered by their own Rájahs and Muntries, to which, having been regularly trained, disciplined, and placed under an European officer, was allotted the defence of the southern frontier of Cachar. This measure succeeded admirably. The Kookies, who, under the firm belief that the corps was raised for the purpose of taking back their own country, flocked to the standard in numbers, were rather staggered at first by the severity of our discipline, recovered however,

when they began to appreciate the value of money, and perceive the regularity with which they received their pay; and all classes have ever since evinced great desire to become soldiers. The Kookie levy now not only furnishes frontier posts to the south, but has three large detachments in the northern hills, protecting the country from the Angami Nagas as well as the Looshais.

To return to the Kookies at present inhabiting North Cachar: it has been mentioned that on being driven from the Tipperah hills, many of them found their way to the north, some without even making an intermediate halt in Cachar. These consisted of portions of only three of the four large clans, the entire clan of Lhumgúms, settling either in Cachar, or going over to Manipur.

The fugitives appear to have been most hospitably entertained by the wild tribes into whose localities they thrust themselves, and settled down in unoccupied parts of the country, among the other villages of Nagas and Cacháries, and have ever since peaceably conducted their agricultural avocations, living in general on good terms with the rest of the people. Disturbances have occurred in which they bore a part, and it would be too much to expect their entire absence among a people so wild and warlike, coming for the first time into a settled country. One of the most serious of these occurred in 1850, of which the following are the circumstances: A hunting party of Kookies of the Changsén clan, returning from their sport, ignorantly attempted to enter a Naga village which was "Genna;" unaware of the Naga custom, and unable to understand the language addressed to them, although entrance was refused, they attempted to force it. An affray took place in which the Kookie Rájáh was slain and the party forced to retire. The person of the Rájáh being held almost sacred, his subjects were eager for revenge, and collecting a body of three hundred men, attacked the Naga village, killing several of the inhabitants together with the headman or Gaon Boora. Serious as this affair was, and though the Kookies were undoubtedly at fault, yet it must be considered that they were savages among whom a certain degree of hospitality is considered more a common civility than a virtue, and being unacquainted with the Nagas, owing to their recent arrival in the country, it is not wonderful that they resented what must have appeared to them

so churlish an act, as refusal of admittance to a party returning fatigued from the chase. Several of the Kookies were transported for this offence, and it has on the whole had a beneficial effect upon them, showing the power and determination of our Government to punish all outrages. Notwithstanding this and several other petty disturbances and quarrels, the new Kookies cannot be characterised as a turbulent race, but on the contrary as one well under control, and easily managed.

For three years after their settlement in N. Cachar, they were exempted from paying any revenue to the state, after which time, they were regularly assessed at an uniform rate of one rupee per house per annum. No European officer being present in the hills on their first arrival, the hills being left very much to the management of Cachárees, the new comers fell into the hands of this class and were subjected to a great deal of petty oppression and extortion and the influence that these men obtained over them, as ministers under us, and on other pretexts, has not yet been entirely done away with.

As subjects, the Kookies must always be looked upon, under existing circumstances, as a poorer class than any of their neighbours, for not only have they to pay the revenue exacted from them by us, which is indeed equitable and light, but they support among themselves a form of government which must be both expensive and oppressive. Each of the four clans is divided into separate and independent Rájáhlics, of greater or less power and numbers, consisting of one or more villages, each of which is presided over by a hereditary chief or Rájáh, whose power is supreme, and who has a civil list as long, in proportion to the means of his subjects, as that possessed by any other despot in the world. All these Rájáhs are supposed to have sprung from the same stock, which it is believed originally had connexion with the gods themselves, their persons are therefore, looked upon with the greatest respect and almost superstitious veneration, and their commands are in every case law. The revenue exacted by these chieftains is paid in kind and labour. In the former each able-bodied man pays annually a basket of rice containing about two maunds: out of each brood of pigs or fowls reared in the village, one of the young becomes the property of the Rájáh, and

he is further entitled to one quarter of every animal killed in the chase, and, in addition, to one of the tusks of each elephant so slain. In labour his entire population are bound to devote four days in each year, in a body, for the purpose of cultivating his private fields. On the first day they cut down the jungle, on the second the fuel being dry, they fire it, and prepare the ground, on the third they sow and harrow, and on the fourth cut and bring in the harvest. Besides the labour of these four days in which the entire effective population, men, women and children work for him, small parties are told off during the whole season to assist his own domestic slaves in tending the crop, repairing his house (which edifice is always built afresh by the subjects when a new site is repaired to) and in supplying wood and water for the family. On the occasion of the days of general labour, a great feast is given by the Rájáh to all his people, so also, on the occasion of an elephant being killed, to the successful hunters, but this is the only remuneration ever received by them, and calls can be made on them for further supplies and labour, whenever it may be required. It says a great deal for the loyalty of the Kookies, that they still submit to these exactions without grumbling, paying at the same time the full amount of their house-tax to our Government.

The Rájáh is the sole and supreme authority in the village or villages under him, no one else being competent to give orders or inflict punishments except through him. His power is of course anomalous, and illegal with respect to our laws and institutions, he being a mere subject of the British Government alike with the meanest of his village, and in no way placed in authority, except as mouzadar, or collector; but still that power exists in nearly full force, and no appeal is made against it by those subject to it. Revenue is exacted, and offences punished by fine and bondage, no murmuring voice, not even that of the culprit, being raised against the decree. I see no method of preventing this self-devotion to loyalty on the part of the Kookies. Violent measures would estrange them from us, and therefore, it is better to let the system die a natural death, which it most assuredly will in time, as the Kookies proceed in the acquisition of worldly knowledge.

To assist him in carrying on the affairs of government, the Rájáh

has a minister and more frequently several, called Thúshois or muntries who have the privilege of being exempt from labour and taxation at his hands. This office is not, strictly speaking, hereditary, although in most cases, except when thoroughly incompetent, the son succeeds the father, but is given to those qualified for it, as being men of property and influence as well as of ability and good spokesmen. The Rájáh himself is on the contrary invariably succeeded by his eldest son, for whom, should he be a minor, the kingdom is managed by a council of muntries. In default of sons, the Rájáh's brother succeeds, and failing him the nearest male relative takes the guddee, the salique law being in full force.

Should the Rájáh die without any heir to the throne, the chief muntri, if he be an influential man, takes his place, or some neighbouring Rájáh of the same clan is called upon to take the government or usurps it. Each of the clans have one great Rájáh, supposed to be the main branch of the original stock, to whom, although those immediately beyond his own villages owe him no allegiance, great respect is shown by all, and acknowledgment of the superior title given, although in power and wealth he may be much poorer than others of the tribe.

No regular courts are held among the Kookies, but complaints are always heard before the Rájáh assisted by his muntries whenever they may be made. Heinous crimes are very infrequent among these people. Theft is almost unknown, and they chiefly offend in slight quarrels and disputes among themselves, which are settled by their Rájáhs, a fine being exacted from the guilty party, according to his means and the extent of his guilt, either in wine, fowls, pigs, goats, cows, or methins. When cases of theft, burglary or arson occur, the criminal loses his independence and becomes a bondsman to the Rájáh for the term of his life. Cases of murder and manslaughter are of course taken up by our authorities and punished by our laws. But the punishment awarded for murder among the Kookies, was confiscation of all goods and property and perpetual bondage for the murderer, his wife and family, who thenceforth became slaves of the Rájáh and did his work. The only crime punishable by death among the Kookies was high treason, or an attempt at violence on the person of the king, and treacherous

commerce with an enemy of the clan : the victim in these cases was cut to pieces with dhaos, but of course no such extreme measures can be resorted to by them in the present day. In cases of adultery and seduction the punishment is left in the hands of the aggrieved husband or father. In the former case, death might be inflicted on the adulterer by any means with impunity, but more generally it was, and now invariably is, the custom to compound with him for a large sum of money, something over and above the original price of the wife, the adulteress then becomes the property of her lover.

In cases of seduction every effort is made, and in most cases successfully, to have the guilty couple married forthwith, a penal price being put upon the bride. All the women in the village, married or single, are perfectly at the pleasure of the Rájáh, and no voice would be lifted against him for co-habiting with any of them, the only prevention being a sense of immorality, and an understanding among the royal families of the whole tribe generally that such conduct is infra dig: indeed there is little temptation, for the Rájáh may have as many wives as he likes or can keep, both polygamy and concubinage being in common practice, female slaves living generally in the latter condition with respect to their masters.

The new Kookies have a much more defined notion of religion than any of the other tribes in Cachar. They recognize one all-powerful god, whom they call "Puthén," as the author of the universe, and although they consider him to be actuated by human passions, yet they look upon him as a benevolent deity who has at heart the welfare and enjoyment of his creatures. He is the judge likewise of all mortals, and awards punishments to the wicked both in this world and the next, by inflicting death or disease. In all circumstances of affliction his name is called upon and sacrifices of animals are made to him, imploring the cessation of his own anger, or the aversion of the effects of that of other deities. Puthén has got a consort, a goddess of the name of "Nongjai" who has likewise power to inflict and remove diseases; her name is generally taken in conjunction with that of Puthén, and in cases of great urgency she is implored to influence Puthén in behalf of the petitioner. Puthén and Nongjai have a son called Thila, who acts under his

father, and has power to inflict diseases on those who displease him. He is considered a harsh and vindictive god, though not entirely malignant. His anger is averted by prayers and sacrifices made either directly to himself or to his father.

Thila has a termagant of a wife called "Ghumnoo," who is also possessed of power, and makes it felt in the shape of slight dis tempers such as headaches, toothaches, &c. She is described as being most jealous of her husband, and of her own position, resenting all omissions of her name in prayers offered up to her spouse. "Ghumoishe" is the deity or demon who exercises the most baneful effect upon mortals. Death is supposed to be induced by his apparition, and diseases of the worst description are caused by his anger, which is supposed to arise from natural bad temper, and cruel disposition and not to answer the ends of justice. By some he is said to be an illegitimate son of Puthén's, but others deny the relationship, and say, he has no connexion with the god whatever. The idea of making the origin of evil proceed, thus, from an illegitimate source is exceedingly clever. Ghumoishe is married to Khuchóm, a malignant goddess who has special power over diseases of the stomach, and these two are the terror of the Kookies; prayers are never offered to them, but sacrifices are made to appease their wrath, and Puthén is likewise called upon to avert it. Hilo is the daughter of this couple and the goddess of poisons, having power to make all eatables disagree with those who have offended her; she is also appeased by sacrifices or her influence is counteracted by prayers to Puthén.

"Khómungñoo" is the household god, whose sphere of action lies within the domestic circle. "Thingbulgna" the forest god, having jurisdiction in the jungles, besides whom there are river gods, and gods of the mountains and rocks. Each metal has a god who presides over it, and exercises power over everything having relation to it. Thus the god of silver is the god of wealth; and the god of iron is held in reverence by blacksmiths, and warriors, and is the god of battle. The gods of rivers, mountains and metals have no distinctive name beyond that of the matter over which they preside, and are merely called "Tui Puthén" or water god, "Thí Puthén" or iron god, &c., which makes me think that they may not be distinct personages, but merely the separate attributes of Puthén itself.

Death and diseases of every kind are ascribed directly either to the anger of the gods, or the malignity of demons, and in every appearance of the latter it is believed that a deity is offended, who must be propitiated.

Some diseases in themselves indicate the power that has inflicted them, but these are few, and it becomes very perplexing among such an extended theocracy to find out the angry god. For the purpose of fixing this identity and conducting all religious ceremonies, there is a class of priests called "Thémpoo" or "Mithoi" who are supposed to have undergone an initiatory education, before admission into the order, which possesses them with much occult knowledge, and obtains for them the privilege of holding commerce with the gods, and divining the cause of wrath and the means of propitiation. This order is held in more dread than veneration by the people generally, and much mischief is often ascribed to them, from the abuse of the influence they possess with supernatural agents. The office is not hereditary, but the ranks of the priesthood are recruited by novices from among the people, who may wish to acquire such dangerous knowledge, and the number is not limited.

Such however, is the superstitious fear of the Kookies that they exhibit the greatest disinclination to be initiated, and to prevent the order dying out altogether, the Rájáhs have at times thought it necessary to coerce some of their subjects into becoming Thémpoos. This feeling of dread is further illustrated by a preliminary form of prayer uttered by the novice in which he beseeches Puthén that if there should be anything wrong in what he is going to learn, the fault may be visited not on him, but on his teachers. What the mysteries of this education may be, it is impossible to say, the Thémpoos themselves being very jealous of their secret, but it is undoubted that they have among themselves a language, most probably an entirely artificial one, quite different from that spoken by the people and perfectly unintelligible to them, which must be the first thing taught to the novice, the rest he most probably picks up from their practice which is as follows :

An individual of a village, being stricken with disease, goes to or calls for the Thémpoo, who *feels his pulse*, and questions him as to the spot on which he first felt himself affected, and on other matters

regarding the nature of his recent occupations. Having meditated for a short time on the replies, he at length names the god who has been offended, and mentions the kind of sacrifice which will appease him, particularising the colour of the animal that is required.

If the victim be a fowl the Thémpoo proceeds a short distance out of the village in the direction of the place where his patient was first affected, and lighting a fire, cuts the throat of the animal, pouring the blood forth as an offering on the ground, and muttering at the same time some praises in the unknown language. He then deliberately sits down, roasts and eats the fowl, throws the refuse into the jungle, and returns home! and this is the whole ceremony which is believed to be so efficacious. Should the sacrifice required be a pig, goat or dog, the Thémpoo invites some of his friends to assist him at the meal, and in the case of a cow, buffalo or methin he has a large dinner party at the expense of the invalid. In fact it is ruinous among the Kookies to fall sick, these spiritual doctors, making in the end quite as long bills as regularly graduated M. Ds. They have also a very knowing way of escaping the responsibility of the ultimate result of the sacrifices, and the possibility of the death of their patient. For instance, a poor man, [and most of the Kookies are poor,] calling in a Thémpoo, may be told that the only effectual and sure means of recovery is by the sacrifice of a grey methin. The miserable invalid expressing his thorough inability to make such a valuable offering, asks the Thémpoo to think again, and say if there are no other means. The Thempoo declares that "he is very sorry, there cannot be the slightest doubt but that the grey methin was the precise animal indicated to him, success *might* however follow the sacrifice of a black and white goat." Should the goat even be beyond the sick man's means, the Thémpoo may mention a spotted fowl as the next most likely thing: and this will accordingly be given. Should success fail to attend the sacrifice the doctor is quite irresponsible, and only demands fresh sacrifices, generally getting them of different animals and colours, every two or three days, until the invalid recovers or dies. This is the only treatment of disease practised by the Kookies, and they have no knowledge of any kind of medicine. Those who have been admitted into our hospitals seem highly to appreciate our mode of

cure, and I do not think it would take much trouble to wean them from their present system both of pathology and religion.

The Kookies believe in a future state, the term of which they do not however fix, although they do not fancy another state beyond it. They have no actual idea of the soul, but believe that the departed assume their old forms again, and inhabit a world of shades, which they always describe as lying to the north. Their religion is intolerant, that is, they admit no one but themselves into their heaven, maintaining that for professors of other religions there must be other heavens somewhere else. Their idea of supreme felicity is the congregation of all the good of the tribe after death in a happy land, where rice grows almost without cultivation, and where the jungles abound in game. The ghost of every animal slain by a Kookie in the chase, or *slaughtered at home for the purposes of hospitality, becomes in this state attached to him, and are his property, so likewise every enemy slain in the field by his own hands becomes his slave. The evil doers in this life form a separate community in the world of shades, and are made hewers of wood and drawers of water to the good. Peace is not a concomitant of this heaven, war and the chase being the leading occupation and amusement, which shows that this people cannot form a notion of happiness without the association of these fierce excitements, however, inconsistent their adoption may be, for in the next world, death is supposed to be unknown. This is an outline of their faith, but it has already begun to be shaken, and they themselves laugh at many parts of it.

They profess the greatest willingness to be taught the principles of the Christian religion, and openly say, "We will become Christians if you will teach us." Dr. Oliffe* spoke to several of them when he visited Cachar on the subject, and they professed a great wish to have a missionary sent among them.

Several isolated instances of conversion to Muhammadanism have already occurred among them, and all those who have been placed much in communication with Hindus, show a great tendency to adopt their customs, without even the inducement of invitation;

* Roman Catholic Bishop of Dacca.

indeed the Manipurees, who were but eighty or ninety years ago a tribe of Kookies, have thrown aside their old faith and embraced Hinduism; and therefore, there is every reason to believe that these superstitions are not deeply rooted in the minds of the tribe.

I feel confident that a zealous missionary with a good medicine chest, and some slight knowledge of the healing art, who would take the trouble to associate with the people, live among them, acquire their language and obtain a knowledge of the general character of the tribe, would in a short time make numbers of converts, and tend in a great measure to raise the remainder from the depths of ignorance and filth into which they are plunged.

The Kookies are naturally a migratory race, never occupying the same place for more than two or at the utmost three years at a time, but removing to new sites as soon as they have exhausted the land in the immediate vicinity of their villages which they appear to do in much less time than any of the other tribes.

The rice raised by the Kookies, and indeed the whole of their agricultural produce, is of a much superior quality to that of the Cachárees and Nagas, which may be owing to their not tasking the soil to the same extent, but abandoning it after the first or second crop. They are extensive growers of cotton of a very good quality, and carry on a large trade with merchants from Cachar, who come up to the hills to buy their crops, bartering the raw material for vessels and ornaments of iron and brass, and live poultry, the latter being considered equivalent to their weight in cotton, and the Bengálí bepáries frequently obtain some extra pounds by making the fowls swallow a few ounces of lead each before being weighed.

Migratory though the Kookies be, their villages have a much more permanent and finished appearance than those of their neighbours. They sometimes consist of as many as a thousand houses, but the difficulty of finding sufficient quantity of arable land, for the supply of such a large population in any one place, causes them to split into different communities and occupy sites considerably removed from each other, and thus in N. Cachar the largest villages do not exceed three hundred houses. When separated in this manner the Rájáh generally takes up his abode with the largest party, the others being placed under Thúshois, or members of his

own family, and all continuing to pay revenue to, and working for the Rájáh as before. But this splitting of communities generally leads to a division of interests, and should the Thúshoi be a popular and ambitious man he sometimes succeeds in throwing off the authority of the Rájáh, and establishing a dynasty of his own. This has been done more than once since the arrival of the Kookies in Cachar; and in their own country when thus separated, villages at a distance from head-quarters were often annexed by other Rájáhs of the same clan; the greatest trouble is, therefore, taken to keep the whole together as much as possible.

When it is found that the land in the neighbourhood of a village is exhausted, early in the cold season a party headed generally by the Rájáh himself, proceeds in search of another spot possessing the necessary capabilities for the support of the population. This being discovered, a road is cleared from the old site to the new one, and temporary huts erected at every five or six miles along it. About the beginning of January the whole population commence conveying their own household property and that of the Rájáh together with provisions, towards their new place of abode; each march occupies about three or four days, the villagers returning two or three times a day to bring on fresh loads to the first halting-place, and thus continuing the journey. When they reach the new site, all the property being deposited in temporary huts, the first thing done is to build a house for the Rájáh. In this occupation all the men of the village are engaged, and it is a matter of no small labour, the palace being sometimes as large as 120 feet by 50, and composed with the exception of the posts, which are of timber, entirely of bamboos and bamboo-matting, the roof being thatched with bamboo leaves. This huge barn-like edifice is raised upon a platform some six or seven feet above the ground, and is divided longitudinally into three halls, the centre of which is left open, the two others being partitioned off into separate chambers for the occupation of the Rájáh's wives, concubines, slaves, &c.

While the men are occupied in this erection, the women are engaged in collecting material for building their own houses, and upon the completion of the Rájáh's abode, the private dwellings are commenced upon, each man building his own. Sick or helpless

members of the society have houses built for them by the community, and the villagers will also build a house for a popular or influential Thúshoi, but no one except the Rájáh can claim their labour as a right.

The village is built without much attention to regularity, and generally takes the form of a rude street or square with several rows of houses on each side. The houses are all gable-ended, of equal height at both ends, constructed almost entirely with bamboos, and raised on platforms three or four feet above the ground : they are of various sizes, according to the wealth of the owner or the number of inmates. A house for five individuals is generally five "láms" by three, a lám being a man's length, and that and the cubit ("tong") are the only measurements used among the people. The houses often contain only one room, but are generally divided into two, and frequently into more ; the number of apartments depends upon that of the wives and concubines possessed by the owner, it being thought indelicate to keep two wives in the same chamber. Upon completion of their own houses the inhabitants construct a strong stockade round the dwelling of the Rájáh, enclosing generally within it the houses of one or two of the chief Thúshois.

The village is next fortified, all roads leading to it being barricaded, admittance lying through a wicket, and the ground in the neighbourhood being thickly planted with "pánjies." Guard houses are also built at the barricades where the young men watch and sleep at nights. These measures of defence are, however, less frequently resorted to now, there being no enemies to fear, even the Angami Nagas abstaining from hostilities with people so well able to defend themselves. The village completed, cultivation is commenced, and the jungles resound with the clash of dhaos. The Rájáh apportions to each individual the land that he is to clear.

In their own country, the Kookies generally perched their villages on the tops of hills, not from any particular love for such elevation, but as offering greater advantages for defence. They also contrived by this means to have the villages under one Rájáh so placed, however distant they might be, as to be within sight of one another, and thus enabled themselves to give notice of an attack by means of bonfires. But in N. Cachar they prefer building on the low

grounds, these being closer to places where the best and largest patches of cultivation can be cleared, and nearer water, whilst danger no longer exists of attacks from without.

The Kookies are a short sturdy race of men with a goodly development of muscle. Their legs are, generally speaking, short in comparison to the length of their bodies, and their arms long. Their complexion differs little from that of the Bengali, and comprises various shades, but the features are most markedly dissimilar; the face is nearly as broad as long, and is generally round or square, the cheek bones high, broad and prominent, eyes small and almond-shaped, and the nose short and flat with wide nostrils. The women appear more squat than the men even, but are strong and lusty, and quite as industrious and indefatigable as the Naga women; working hard all day either at home or in the fields, and accustomed to carry heavy loads. The men, like the Nagas, are inclined to be lazy, though not to such an extent as that tribe. They love to sit on high platforms raised for the purpose in their villages, and pass the day in conversation and smoking. Men, women, and children all smoke to the greatest excess. A Kookie is hardly ever seen without his pipe in his mouth; whether labouring or travelling it is his constant companion, and one of his few means of calculating time and distance is by the number of pipes he smokes. The men smoke a pipe, the bowl of which is either made of brass, rudely ornamented, or of the end of a small bamboo tube, a reed being let in near the knot, as a mouth-piece. The women imbibe the vapour through water; an earthen bowl is introduced into a bamboo tube filled with water, from which issues the mouth-piece, and this water when well saturated with the oil of the tobacco is drunk by the men with great relish. They also chew tobacco in great quantities.

Rice is their staple food but they are very fond of flesh of all kinds, especially that of tigers and elephants, which they imagine imparts strength; they also eat dogs and cats, and nearly every animal in the jungle. But they are not quite so indiscriminate as the Nagas in their food, and do regard some living creatures as unclean, and avoid carrion, except when presented in the shape of a dead elephant, which they cannot resist. They manufacture several kinds of fermented liquors, from rice, and have a kind of rice which they grow for the especial pur-

pose ; these drinks are, at least some of them, not without an agreeable flavour, and are but slightly intoxicating. They also distil a spirit from rice, which is strong enough to ignite. The Kookies are however far from being intemperate, and are seldom or never seen intoxicated. Without exception the Kookies are the most filthy people on the face of the globe. Neither their bodies nor their clothes are ever washed, and in consequence they are eaten up with skin diseases, and their persons and garments swarm with lice, these latter they pick from one another's heads in numbers, and eat with the greatest gusto. This uncleanliness subjects them not alone to cutaneous diseases, but to long and lasting visitations of epidemics which sweep a quarter of the population away at a time ; and the slightest flesh wound on their bodies or limbs festers and becomes a serious sore. The women appear somewhat cleaner than the men, and much less grave and sedate in their manner. The men are generally silent and serious in their demeanour, patient and slow to anger, bearing oppression for a long time without murmuring, but when roused at length they are uncontrollable in their passion, and deliberate in their prosecution of revenge. Feuds are kept up for ages between the clans, and although they may not be actually at war during the whole time, many petty injuries are inflicted, and insults bandied.

Notwithstanding the prevailing custom of exacting large presents for daughters given in marriage, the great desire among the people is for male offspring, and when signs of parturition become apparent the women pray and chant hymns to Puthén to favour their object. The delivery is effected by means of professional matrons of the village who are entitled to some small fee for their trouble. Should the child be male, the mother sings a song of joy and thanksgiving, giving expression to hopes of long life and honorable action on the part of her progeny. Three days after the birth of a female child, and five after that of a male, a feast is given to the immediate friends of the family, of which the child itself partakes ! The mother masticates a mouthful of rice until well salivated and then inserts it into the mouth of the infant, after the manner of birds feeding their young : and this mode of nourishment is ever after pursued, although the milk is not wholly discontinued for several months.

At between nine and fifteen months of age, the child can walk by itself and begins to speak. Both male and female children go stark naked, until they are five or six years of age. The first instruction that boys receive is to learn to throw stones with precision. Youngsters of eighteen and twenty months are pitted against each other at a few yards endeavouring with all their might to hit one another: as they grow older the relish for this amusement increases; particular stones—round and smooth—acquire value in their eyes, and these are lost and won among them according to their success as marksmen. From stones they take to throwing sticks in the manner of javelins, and then learn the use of the bow and arrow. Their games are all warlike. Parties of them under a leader take up a position on the play-ground, which they defend against the attacks of other bands, stones; sticks and headless arrows being used in this mimic warfare. Where tobacco is easily obtained Kookie children smoke almost as much as the men, both boys and girls commencing the practice at the early age of five or six years: nor does it appear to have any baneful effect upon them. At twelve or thirteen, the boy is compelled to put aside boyish things, and commences undertaking the labours of cultivation. He is also at this age no longer allowed to sleep in the house of his parents, but associates with the young men whose duty it is to guard the village. He is still, however, strictly under parental control, takes his meals at home, and assists his father in the field. Filial respect takes a curious form among the Kookies. The father's name is held sacred from utterance by the son, and in common intercourse is never used, the style of address both to him and of him to others being simply "my father" (*Kapá*). But when stung by insult, or rushing to the battle this rule is broken through, and a man will exclaim "How dare you say this to the son of so and so!" or in the latter case "Who dares to meet the son of &c." A Kookie boy of twelve is very different from most other children. He is sparely built, and has an unhealthy look; most probably some hereditary taint or cutaneous disease is even at this early age breaking out in sores and blotches on his face and limbs; but he is active beyond anything human. There is not a tree which he cannot climb, nor a position into which he will not throw himself. His endurance of fatigue is almost

miraculous. I have seen a boy of not more than ten years of age, carrying a burden weighing about 30lbs. for a long march of some fifteen or sixteen miles, on a foot-path rugged and difficult, over country where high mountains had to be ascended and descended, lifting his legs as lightly as a cat, never making a false step, and his skin being perfectly dry and free from perspiration. Nor was this done only for one day, but for ten, one after the other: and I believe any other Kookie boy could do the same.

At seventeen or between that and twenty the Kookie reaches his perfect physical state. He has now filled out, and looks strong and lusty. He has gained the strength of manhood without losing the agility of youth. He has learned the use of all the weapons of war, defensive and offensive, and is looked upon as a warrior and hunter as well as cultivator. It is about this age that he generally marries and sets up on his own account. But he has frequently, like Jacob of old to serve many years in bondage before he can claim his bride.

If his parents are rich, or he himself has thus early acquired wealth, this servitude is of course dispensed with, and suitable presents being made, he at once enters the married state. The circumstances attending the ceremony are as follows:—

The young man having fixed upon an object of his desire, sends a friend of his own to acquaint his chosen and her parents with the state of his heart. After the friend has accomplished two such visits, without any objection being offered, the young man's father makes a formal visit, and negotiates the marriage, the price of the wife being then determined on. This price depends upon the wealth of the contracting parties, and is seldom or never given in coin, but in cloths, ornaments and cattle. The poorest individual cannot get a wife without an expenditure of about thirty rupees, or personal bondage for two or three years. The preliminaries being settled, on the eve of the wedding-day the young men of the village congregate at the house of the bride's father, and feasting, dancing, music and athletic games are the order of the day and are carried on during the whole night. Next morning the young couple clothed in their best apparel, are led before the Thémpoo, who presents them with a stoup of liquor out of which they both drink, while he con-

tinues muttering some words in his unknown language : two small threads of cotton are then tied round the neck of the woman, and one round that of the man. These strings are never taken off afterwards, but allowed to fall away of themselves in the regular course of wear and tear, and are then not replaced. Lastly a small comb is presented to each by the Thémpoo, who again mutters something in his mysterious accents, and the bride is then taken away to her husband's house.

Great religious importance appears to be attached to the comb among the Kookies. The article itself consists merely of a number of thin slips of hard bamboo, pointed at both ends, placed in a row, and bound tightly and closely to one another at their centres, resembling when made, a coarse small tooth-comb. This is always worn entwined in the hair, which is long, and the Kookie never separates himself from it, it being considered a most unlucky omen to lose a comb. Each man has his own comb, and to use another's or to allow another to use his is considered equally improper and unclean, and subjects both parties to such withering contempt from others, that in many cases they do not survive it. Brothers even cannot use the same comb, man and wife being the only people allowed to do so. On the death of any individual his comb is buried with him, and his near relations break their combs, and remain for three or four days with dishevelled hair, after which new combs are again made.

The most strict rules exist forbidding too close intermarriage in families ; cousins cannot be so allied. Widows are permitted to re-marry, but no woman can have two husbands. Legitimate children take precedence, in inheritance, of the elder illegitimate ones. But in default of legitimate issue a natural son succeeds to his father's property before all other male relations whatever. Daughters inherit no wealth, but live in their father or mother's house till married. It is not prohibited to intermarry with different clans, or even with Bengalis or Mussulmans. But even the former practice is much discouraged though sometimes practised, and the latter is never heard of. Kookie women, it is true, have been abducted, and become the concubines or slaves of some people in Cachar, but it is seldom the case. The Thadon and Shingshón clans are closely allied,

tradition declaring that the Thadon sprung from a father, and the Shingshón from his eldest son. Some intermarriages therefore, take place between these, and their royal families also occasionally give away daughters in marriage to each other. But there is greater objection and a good deal of ridicule attached to the marriage of a Thadon or Shingshón with a Chángsén or Lhungúm, although it is sometimes done, neither is it common for a Chángsén to marry a Lhungúm, and the same exclusive system prevails through the other petty clans of the Kookies, whose names even are too numerous to be mentioned.

It is at present perfectly impossible to estimate the entire Kookie population on this frontier, many tribes existing to the south and east with whom we have had as yet no connexion, and there being numbers in Manipore of whom little or nothing is known. In Cachar Proper about 1500 houses of all clans, but chiefly Lhungúms, pay Government rent, which would give a population of about 7500 for that part of the country. In N. Cachar, exclusive of old Kookies, there are 1200 rent-paying houses, giving a population of about 6000, supposing five to inhabit each house: of these the Chángsén clan are most numerous, the Thadon and Shingshón coming after, there being no Lhungúms in the country. In Manipore no correct computation can be made, but there may be as many in that country as in the whole of Cachar put together. But the greater part of the population, among whom are the Looshén, Télmok, Hankeep, Chomfoot, Solbee, Molbeam, and Thanguey Kookies, lie beyond our ken altogether in the vast unexplored territories to the south of Cachar and Manipore.

Oaths taken among the Kookies are held most sacred, and are never resorted to except on the most serious occasions, such as when a long feud is being healed up between two clans, or a treaty of alliance entered into. Both parties swear to maintain peace or good fellowship. A dhalo is placed on the ground, and on it are arranged rice, salt, earth, fire and a tiger's tooth. The party swearing takes the dhalo and puts the blade between his teeth, and biting it says: "May I be cut with the dhalo, in war and in the field; may rice and salt fail me, my crops wither, and I die of hunger;

may fire burn all my worldly possessions, and the tiger devour me, if I am not faithful."

The solution of omens is left much to the priests, and their opinion is taken upon yolks of eggs and entrails of fowls, from which it is supposed the future is revealed. Teeth of tigers and other animals are carried about the person, suspended round the neck as talismans, and are supposed to preserve the individual wearing them from being devoured by wild animals. Hunters carry about a small round stone enclosed in a wicker-work basket, and believe that the presence of this in the jungles with them ensures good sport.

The Kookies are great hunters, and are passionately fond of the sport, looking upon it, next to war, as the noblest exercise for man. They kill tigers, deer and smaller game by means of poisoned arrows. The bow is a small one made of bamboo, and very slightly bent, the string being manufactured of bark. The arrow, the head of which has a barbed iron point, is about eighteen inches long, being drawn to the chest and not the ear, and therefore delivered with no great force, the destructive effect lying chiefly in the poison. With such an instrument the great art in hunting lies in stealthily approaching the animal near enough to deliver the arrow with effect, and in following it up after being wounded to the spot where it is found lying dead. In this the Kookies excel, being able to prowl about the jungle as noiselessly as tiger-cats, and being equal to North American Indians in distinguishing tracks. Tigers are also killed by spring bows with poisoned arrows set in the jungles, and by poisoned pánjies planted in their paths.

Elephants are slain in great numbers by the Kookies wherever they are to be had, not only the tusks but the flesh being highly prized. Parties of twenty and upwards go out in pursuit of them at a time. When some recent elephant track is discovered in the forest, two or three of the party ascend some convenient tree, whose branches overhang the track, the remainder follow it up, and having got on the other side of the herd, scare it towards the ambush by shouting, beating gongs, and discharging fire-arms. Here, while passing, the animals are assailed from above with long spears having huge iron barbs covered with deadly poison : every wound inflicted results

in the death of the animal at not more than half a mile from the spot on which he was hit. So wary are the elephants, however, that it is seldom that more than two out of a herd are killed. At the place where their game is found dead they commence cutting him up, and extract his tusks; laden with these and as much of the flesh as they can carry, they return home, and other parties go out and encamp in the neighbourhood of the carcase until they have entirely consumed it, or are driven away by the effluvia of decomposition. Portions of the flesh that they cannot immediately eat are dried and smoked to be kept for future consumption. The Kookies also hunt the methin or wild cow, which they have likewise succeeded in domesticating, having introduced the breed to Northern Cachar.

The deadly poison used by the Kookies is, they say, extracted from a tree which does not grow in these parts, but the article is brought to them for sale by tribes inhabiting the borders of Manipur. The substance is of a dark blue or black colour and of about the consistency of common rezin. To make it serviceable it is ground down with capsicum seeds and tobacco juice, so as to form a pulp, with which the weapons are smeared, cotton soaked in the mixture being also tied to the iron under the barb. I had once the cruelty to try the effect of this poison on two domestic fowls, to one I administered internally a dose equal to about two common sized pills, and I punctured one of the legs of the other, so as merely to draw blood, with a pointed bamboo about the size of a toothpick which had been dipped into the mixture. The latter died in twenty minutes without much apparent pain, and in the former no effects whatever could be perceived, and it may be crowing to the present day. Another poison called deo-bi, is used by the Kookies to kill fish, and has an intoxicating effect upon them, forcing them to the surface, when it is thrown into the water. The Kookies also spear fish, but have not much idea of catching them by the hook or net.

The dress and ornaments of the Kookies are most diverse, and some not wanting in taste. These articles are chiefly of their own manufacture, and they indent but seldom on Manchester for their cottons. They weave several kinds of cloth, of a coarse but

strong texture, and dye them with wild indigo and the munjattie dye, making the colours fast. They also make the thick rug or counterpaine in common with the old Kookies. Their dress consists commonly of coarse cloth tied round the waist, the end of which is allowed to hang down in front, like an apron, reaching as far as the knee; in cold weather a cloth is thrown over the shoulders. Those Kookies who have been much in the plains, have already taken to the dhotie and mirzai. All classes bind a cloth round their heads as a turban, and the more wealthy have it gaily ornamented with the red downy feather of the hullee pakee bird, and red ribbons of dyed goat's hair, fastening the whole down by a climstrap composed of a string of cowrie shells. The Rájáhs also wear a plume, consisting of the long tail feathers of the king-crow, to the number of fifty or sixty, tied in a bunch to a pointed stick or piece of iron which is stuck into the large knot of hair on the back of the head, many other sorts of plume consisting of feathers and goat's hair are worn. The poorer classes have invariable a large iron skewer or porcupine's quill stuck into the back knot, answering the double purpose of a tobacco pricker and a hair pin. A knitted bag is worn by most Kookies attached to a shoulder-belt of deer skin, tanned with the hair on or ornamented with cowrie shells; the dhaο, a short triangular piece of iron, is also worn in a broad sheath, suspended by a shoulder-belt ornamented in the same manner. The more wealthy having the belt four or five inches broad, with six or seven rows of shells, between which are inlaid blue-beetle's wings, and the poorer people contenting themselves with two rows of shells on a narrow strip of leather. The sheath is further ornamented with a goat's tail pendant as a tassel. The very poor dispense with the sheath altogether, and carry their dhaos stuck into the cloth round their waists. The dhaο has a small handle of brass or wood, the latter generally bound in cane or covered with leather, to which is attached, a tassel of goat's hair dyed red. Garters of goat's skin are worn below the knee, the beard of the goat and part of the skin of the neck being chosen for this purpose. The Kookies make two or three kinds of spears, one a light javelin with a long lancet-like point, and a haft of about four feet in length, and another of the same kind but with a pear-shaped head. The most common, however,

is an ungainly large bladed head, shaped like a diamond, the haft, with the exception of about a foot, being of metal also. Although the spear is commonly carried by the Kookies, they do not trust to it to the same extent as the Nagas, but prefer their dhaos, with which they are most expert. Kookie women likewise carry an iron spear or walking stick when travelling: this is shaped exactly like a straight spit with a button at one end as a handle. In war, the defensive armour of the Kookies consists of a breast piece made of rhinoceros's hide, which girds the whole body; it is suspended by the shoulders and tied behind, and is quite impervious to either spear thrown or arrow shot, but would be of no avail against a bullet.

A small and very peculiar shield is also carried in battle, its shape is that of a trapezoid with a length of two feet, and a mean breadth of fifteen inches; it is made of buffalo hide, and the upper or broader half is covered over with small round conical brass plates, overlapping one another, from which are pendant long tassels of goat's hair dyed red, which hang down on the lower half. This is suspended round the neck by a thong of leather, and has a handle on the inner side. This also is far from being bullet-proof. By far the most formidable means of defence, and it may be said of offence also, used by the Kookies, are small bamboo spikes commonly called "panjies." These are carried to the number of about a hundred, by each man equipped for battle, in small wicker-work quiver-shaped baskets. They are made of the hardest and best seasoned bamboos, are seldom more than six inches long, and only thick enough to prevent any great pliancy. They are pointed at both ends, at one only sufficiently so to enable them to be easily stuck into the ground, at the other as sharply as any lancet, and so hard is the bamboo, that it is able to take a fine enough edge to make it available in most surgical operations short of amputation, and a bamboo-knife is the only one used by these wild people, either in operating upon themselves, or in castrating bulls, pigs, &c.

The panjie thus made, is used in the defence of villages when an attack is expected, the whole of the ground round the villages, except the roads leading to it, being thickly planted with them, the roads themselves being always barricaded. A party retreating before superior numbers also avails itself of this mode of defence,

and care is taken while planting the panjies, to conceal them as far as circumstances will admit, by covering them with loose grass, &c. They are stuck in at a slight angle in direction of the party supposed to be advancing, and any foot placed upon them, with the whole weight of the body on it, is pierced from the sole right through to the instep, the individual being perfectly disabled. The wound inflicted is most dangerous, many dying from it, and it is invariably long in being healed. Moreover in very fierce feuds between the tribes it was the custom to have the panjies poisoned. Shoes even are not a sufficient guard against these panjies, for although a stout sole is able to resist them yet they pierce the sides, where the foot overlaps. The only method to counteract their use is carefully to pluck them out of the ground, and this causes great delay, and cannot be done when the advancing party is under fire.

The women wear a small blue cloth wrapped tightly round their thighs, and reaching from below the navel to the knee; another cloth is thrown over the shoulders. They have no head dress but a luxuriant crop of not coarse hair, which is parted in the middle, and plaited at the sides, being tied up behind in a knot. Armlets, bracelets, necklaces and earrings are worn by both sexes, the two former being generally made of brass, and very massive. A common armlet worn by the men consists of two semi-circular boar's tusks tied together so as to form a ring. And among the bracelets, one is hollow, having a leaden bullet inside it, which causes a tinkling sound on every movement of the wearer, and another of ivory, into which the wrist is slipped, is worn on the left hand by archers as a guard to prevent the bowstring hurting that hand, when released by the fingers of the right. Necklaces are made of red cornelian beads, or of white beads manufactured from shells by rubbing them down into small cylinders, and women wear necklaces of beads of a blue stone, very common among the Kookies. The Chângsén and Lhumghúm tribes bore their ears in the same manner as the old Kookies, and insert into the holes rings of silver or copper four or five inches in circumference, through which they again hang blue and red stones, attached by cotton threads. Rings of brass wire are worn on the fingers by both sexes.

The Kookies are much attached to their weapons and ornaments,

most of them being heir-looms, and handed down from father to son for many generations. Thus, although their most valuable ornaments are mere cornelian beads, they will not accept those of European cutting, at any thing like the same value which they attach to those of their own, which are rude and badly polished. They attach to some of these and to a stone called "Toinoo," about the size of a pigeon's egg, which I have never seen, and which is very rare, a most exorbitant price, valuing the latter at hundred methins, or about three thousand rupees. Familly ornaments are therefore seldom in the market, and only change hands on the occasion of marriages between wealthy people and royal families.

Dancing does not appear to be a favourite amusement among the Kookies, and their dances are by no means interesting; the women dance less than the men, and their performances consist of a number of awkward steps and hops made with the knee-joint very much bent. The men have also a war-dance in which they flourish their dhaos, &c. But the acting is by no means so real as that of the Nagas. They have, however, a far better notion of music than any of the other tribes, and there is something solemn and plaintive, though monotonous, in many of their tunes. One in particular which is sung by large parties, has all the solemnity of sacred music, and might easily be so adapted. Their songs are mostly in a language which the people themselves do not understand, although it is undoubtedly a dialect of their own. Most probably the old form of speech in which they were originally composed has become obsolete, and the words have been handed down merely to preserve the tune. The only fragment, to which, after some research, I have been able to attach any meaning, is the following, which is not entirely wanting in poetical merit :

“Jólkhé̄ng” chéngying ding yong kadaime
“Chaltuitáṅga” “Kimleném” tóṅga gñáiye,
Cháh pang wikai chabunge kanéme.

which, being interpreted, is—

I also wish to go to Jólkhang—sighing
On the mountain of “Chaltui” I hear Kimlenem,
And I have become like a bent bamboo.

This when rendered into the modern dialect, without reference to the metre is as follows :—

Keiyong “ Jólkhenga” chénadind kadoiye
 “ Chaltui” Chinga, “ Kimlenem” ahaina kagñaiye
 Chái akón to bunge ka oome.

Chaltui tang or ching means the mountain of “ chaltui,” chal and tui being two words signifying bamboos and water. The comparison of himself to a bent bamboo, by the poet, may therefore, have some punning reference to the name of the mountain, on which his mistress is sighing. These old songs are the only ones generally known, and common to all. There are also modern compositions among the people, but each man is generally his own poet, and musical composer, and his works die with him. The Kookies use a musical instrument called the “ ghoshem,” which consists of a hollowed pumpkin, into which are inserted seven bamboo pipes, which are regulated by stops, a mouth-piece is inserted at the stalk end of the pumpkin, and the different notes are produced both by inspiration and respiration. It is an instrument of no great power but has a soft and pleasing sound. Chimes are also beaten upon gongs of different sizes with good effect. The largest of these gongs are sometimes upwards of two feet in diameter, and have a fine deep sound; they are valued at about thirty or forty rupees each. A small gong about six inches or less in diameter is used as a war-gong, and is beaten during battle by an individual appointed for the purpose. The sound can be heard for four or five miles round. This gong is attached to the families of the Rájáhs, and is handed down as an heir-loom of great value, and is consequently never parted with.

The manufacture of gongs is not carried on among the Kookies: they were brought originally from their own country, and are doubtless of Burmese handiwork.

The Kookies bury their dead, and no religious rite appears to be attached to the ceremony. The bodies, even of the poor are kept above ground as long as possible, and during that time the house of the deceased is open to all comers, who walk in and look at the corpse, and are entertained at the expense of the estate of the deceased. Indeed to such an extent is this love for lying in state carried, that the bodies of wealthy men, or of Rájáhs, are dried

over a slow fire until the flesh gets smoked and hardened to the bone, they are then dressed and laid out, and kept in this way for a month or two before being finally deposited in the earth. During the whole of this time, the hospitality in the house of mourning is unbounded, methins, cows, buffaloes, horses, pigs, goats and dogs being slain in numbers to feast the guests, portions of the flesh being likewise sent to distant villages where any friends of the family may reside. It is believed that, while the body is above ground, all the animals slain on its account will be attached to it in the world of shades, and hence the great profusion. On the death of a Rájáh the entire population are supposed to go and see his corpse lying in state, and partake of the hospitality. When the time has expired, the body wrapped in clothes is placed upon a bier, having several kinds of eatables and wines placed near its head, and a dhalo and spear by its side. The burying-ground lies only a short distance out of the village, and here, a grave being dug, the body is placed in a mat coffin together with eatables and drink (the weapons being taken away) and covered up with earth. The skulls of all the animals slaughtered during the lying-in-state are then planted on posts all round the grave. It is thought necessary when a Rájáh dies to have the fresh skull of one enemy at least stuck over his grave, that enemy also being supposed to become a slave of the deceased in the next world. For this purpose it used to be the custom for a party to undertake a war-expedition as soon as the death of the Rájáh was known, and return in time for the funeral with the required trophy; but at present the Kookies in North Cachar can no longer do their kings this honour, and therefore, they content themselves with getting an elephant's head if they can, and if not, satisfy themselves by slaying hecatombs of cattle and game.

An account of North Cachar would be incomplete without some reference to the wild and powerful tribes of Angamie and Kutcha Nagas, which occupy the tract of land lying immediately to the east of the province. These people are the terror and scourge of the inhabitants of N. Cachar, and are in the habit of making constant forays into the country, burning the villages of the peaceful Meekirs and Nagas, and sparing neither sex nor age.

The country inhabited by the Angamies is, I have been told, very different from North Cachar and resembles more the Cossiah and Jynteah territory, an absence of bamboo jungle and substitution of grass in its place being the chief peculiarities. This being the case the method of cultivation carried on by the Angamies is materially different from that in these hills. There being no jungle to cut down, the low lands are terraced into small fields which are regularly irrigated and permanently put under cultivation.

Living near the Angamies are the Kutcha Nagas, who are likewise independent and warlike. Little is known concerning this tribe, and I believe it has only recently been ascertained that they are distinct from their neighbours, than whom they are far less powerful.

The Angamie Nagas select for the sites of their villages the most inaccessible peaks of the highest hills, and generally fortify themselves in their position with stockades and ditches, as well as by planting panjies in the neighbourhood. Their houses and domestic arrangements resemble in a great measure those of the Aroong Nagas; and they have much the same idea of religion. The management of communities is also on precisely the same principles, although conducted on a much larger scale. The Angamies have no recognized head or chief, although they elect a spokesman, who, to all intents and purposes is powerless and irresponsible; hence the great difficulty we have had in dealing with this tribe, the arrangements made with the spokesmen being set at naught by the villagers.

The Angamie and Kutcha Naga tribes are computed at about 125,000 individuals, divided into about one hundred villages, of which four among the Angamies, viz. Mozumah, Jopshemah, Konamah and Koheemah are the most powerful, and exact tribute from the rest.

These villages are frequently at war and feud with one another. But they appear to conduct hostilities among themselves in a more civilized manner than when they attack the inhabitants of Cachar; for, however fiercely the feud may be raging between the men, the women of the contending parties visit one another at their different villages, without being subject to violation or detention. In warfare generally, however, the Angamies are ruthless savages, as subtle as

the serpent and fierce as the tiger. They conduct their approaches with every circumstance of stealth and wariness, prowling in the jungles for days in the vicinity of the village they intend to attack, if it is too strong to be carried by a coup-de-main, watching for an opportunity when the inhabitants may be completely off their guard. When resistance is expected, their general time for an onslaught is just before day-light. The village is fired and the savages rush through it massacring the inhabitants as they attempt to escape from the flames. When, however, plunder is the object of the foray (the more common reasons being long established feuds, and among young warriors generally only the ambition to distinguish themselves), and the attacked party are greatly the weaker, the village is boldly entered in broad day, every soul except those reserved for slaves being put to the sword, their heads together with the plunder being carried off as trophies, and the village fired on departure. In the retreat, laden as they are with plunder, they march with the greatest celerity, making it quite impossible for regular troops to follow them, did even the nature of the ground permit. Bad as the communication is among the hills, the Angamies do not trust to its channels, but plunging into the densest jungles, follow the tracks of wild beasts, and the courses of small streams, reaching their homes without fear of being overtaken.

The Angamies have not only displayed great enterprise in war, but they are also remarkable among the tribes for their love of commerce. Many of them find their way down to the marts in Cachar and Assam, some proceed as far as Gowhatti, Sylhet and Dacca, and some have even gone as far as Calcutta in pursuit of trade. They bring down from their hills, ivory, wax, and cloths manufactured from the nettle fibre, and take up in exchange salt, brass wire, shells, gunpowder, &c. &c. They fully appreciate the superiority of fire-arms over other weapons, and have succeeded in providing themselves with a considerable number of muskets, which they use with effect. Their other weapons are the spear and dhalo, the former a most formidable instrument with a broad blade, and sometimes as many as three or four barbed prongs down the sides, the haft being ornamented with goat's hair, dyed red, bound round it. In defence

they use panjies, making them somewhat larger than the Kookies, and carry a huge shield some five or six feet in length by one and a half broad, made of mat-work with bear and tiger skins stretched over it and decorated at the sides and top with feathers and plumes of goat's hair. These shields are worn, attached by a thong, round the neck, in the centre of the inner side there is also a handle for the grasp, and the whole is supposed to cover the individual from the sole of the foot to the crown of the head, but it seems to be a very cumbrous and ineffectual defence, although most adroitly managed by those who carry it. The Angamie dress consists of a black cloth kilt, very tastefully ornamented with white cowrie shells rubbed to a fine polish, wrapped tightly round the thighs. A covering of coarse black or white cloth is thrown over the shoulders, and the leg just above the calf is girded with a number of thin cane strings. In travelling, the whole of the leg from the ankle to the knee is enveloped in gaiters made of mat-work and dyed red and yellow. In war a collar is worn ornamented with red dyed goat's hair and shells.

The Angamies are very fond of ornaments, and prize shells and brass-wire more even than the Aroong Nagas.

They are expert thieves and glory in the art, for among them, as with the Spartans of old, theft is only dishonourable and obnoxious to punishment when discovered in the act of being committed.

One custom practised among them may perhaps give a hint to some gourmands in civilized life, who consider that whipping a sucking pig to death, instead of legitimately sacrificing it, develops in a greater measure the delicacy of the flavor. The Angamies, when preparing a fowl for the table, pluck all the feathers off while the animal is still alive, and releasing it, stone it to death, maintaining that the flesh is highly improved by this process!

During the settlement of the frontier on the occasion of the lapse of Cachar to our Government in 1832, the Angamies were first brought to our notice, having endeavoured to intercept our officers when crossing the hills between Manipur and Assam. They were attacked and defeated with ease owing to their having at that time no knowledge of fire-arms. Nevertheless in the succeeding year, an expedition into their hills was met with the most determined resistance.

It appears to have been our object at first and for some time, under the supposition that the country lay within our territories, to exert a control over the tribe, and exact a certain tribute, however small, in token of our supremacy; and for this reason, as well as to punish and prevent the recurrence of the inroads and forays which the Angamies were in the habit of periodically making into North Cachar and the plains, no less than ten expeditions were sent against them. Some of these were directly hostile, others pacific and conciliatory, but none were attended with any permanently beneficial effects, it being impossible to negotiate with a people who have no recognized head, and exceedingly difficult to punish a tribe so subtle in effecting their escape. Villages were indeed burned, but the inhabitants always escaped, and little or no inconvenience was caused by the fire, as the houses being merely built of reeds and grass could be replaced at a day's notice when the troops had evacuated the site. As for the exaction of tribute, in most cases the Gaon Booras or spokesmen agreed most readily to the measure, but the majority of the villages failed to ratify the arrangement, and prepared to resist the exaction by force of arms.

In 1849, a darogah on duty in the hills, however, having mixed himself up in some private differences among the tribe, was murdered, together with several of the sepoys of the guard which accompanied him, and to punish this outrage Lieut. Vincent was sent up to the hills with a small detachment of troops. He found the hostile party strongly entrenched in a hill fort in the neighbourhood of Konamah, and his force being too weak to dislodge them, he endeavoured during the entire season to prevent them from communicating with other villages, obtaining supplies, or cultivating their own fields. His detachment was even too small for this purpose, and his failure in effecting it so encouraged the evil-disposed of the tribe, that the garrison was much augmented, and many of the villages which had formerly remained neutral declared their hostility to us, although some still remained faithful. In 1850, therefore, it was found necessary to send up a force of five hundred men with two three-pounder guns to capture the fort, and bring the hostile clans to terms. The fort was evacuated after a siege of sixteen hours, and razed to the ground, but the garrison all escaped.

In subsequent operations against the disaffected villages, who displayed no fear of our power, but frequently challenged us to come on and fight disrespectfully calling our three-pounders "choongas" or bamboo tubes, one action took place which resulted in their gaining some experience of the object of their contempt. A large body of the village of Kekremah, being obliged to retreat before our troops and allies in a somewhat open piece of country, were subjected to the influence of grape, and some three hundred were placed hors-de-combat. But no advantage was taken of this victory, and all the troops were shortly afterwards withdrawn from the hills, Government having determined to abandon all control over the country, and to mix itself no further in its petty internal warfare. Our Angamie auxiliaries having raised for themselves a host of enemies in their own country were offered sites and protection in our territory, but preferred holding their own at home: and a European officer was deputed to North Cachar with a body of troops supposed to be sufficient to place the province in an effectual state of defence. A strictly defensive policy has been maintained ever since, and although several bloody forays have been lately made by the Angamies on some of our villages in the plains, no measures have been taken to retaliate.

At present the eastern frontier of N. Cachar is defended by a line of stockaded outposts, about fifteen or twenty miles apart, between which communication is kept up by means of patrols, the guards stop and disarm all foreigners approaching the frontier, and although, owing to the intricacy of the country, they might easily be evaded by a foe so subtle as the Angamie, yet the system has hitherto been effectual, none of the enemy having attempted to push through.

Another, and I should think a far more effectual way of quieting and civilizing this rude tribe, has lately been proposed by Lieut. Bivar, and has been partially adopted. The Angamies are soldiers both by nature and taste, and they evince the greatest eagerness to get employment under us. Sanction has been given to the entertainment of twenty recruits of the tribe in the Nowgong Militia as an experiment, and the measure has succeeded beyond expectation, the young men entertained having become good soldiers, and displaying

great pride in their arms and profession. Any number of the tribe could now be enlisted, so great is their desire for service, and this presents a most sure way of eventually quieting the people, those entertained acting in a measure as hostages for the good conduct of their village.

Left undisturbed from external aggression, the internal feuds among the tribes being put to an end, subject to the influence of a powerful and benign Government, opened out by lines of good permanent road which are every where in projection, and undergoing with all a very slight taxation, there is every chance of North Cachar eventually repaying the care and expense which is being lavished upon it. Plunged, as the inhabitants at present are, in the darkest ignorance, even when contrasted with the population of any other portion of our territories, trusting as they do solely to themselves for every article of consumption, and unacquainted as they are with every portion of the world beyond their own hills, it would be folly to look immediately for the production of such effects. But it only requires the diffusion of a little enlightenment, and a proper direction of the energies of the people, when that enlightenment has developed their enterprise, to make the inhabitants of these hills a flourishing and happy community. The partial civilization which has reached the Cachárees has been inculcated by those least qualified to administer it. They sought from the Bengali amlahs of our courts the arts by which to acquire preferment and use power. But this is no type of the effect that might be produced were the education of these wild and simple people placed in other hands, were only a little of that labour, which is daily being expended, with so little success, in uprooting the prejudices of stiff-necked Hindus and Muhammedans, applied to the Kookies and Nagas.

Throughout India I know of no field for missionary labour which gives promise of such fertility as the hills of Northern Cachar, and yet no missionary has penetrated them. Here are no mighty rocks in the shape of bráhmanical philosophies to be blasted. No deep ravines like Muhammedan sensualism to be filled up, but the field lies open for cultivation, and merely requires the rank weeds of evil passions to be kept down, and the small stones of petty superstition to be lifted, to be ready for the fructification of the good seed.

APPENDIX.

I.

Comparative Vocabulary of the Manipoorie, Cacharee, Thadon, Aroong, Gnámie, Béteh, and Meekir languages.

OETHOGRAPHY.

The following rules are maintained throughout the vocabulary :—

Vowels.

á	pronounced like a in father.	a	pronounced like a in man.
é	e in there.	e	e in men.
í	i in police .	i	i in pin.
ó	o in note.	o	o in not.
ú	u in pull.	u	u in fun.
oo	oo in moon.		

Consonants

have the same sounds as in English with the following restrictions ;	
g is always a hard sound.	h is always aspirated.
j is much softer than in Eng.	n is nasal when overlined.
s is never sounded like z.	w and v are never used as vowels.
ph is never pronounced like f.	gh and kh are like the Persian Ghain and Khe.
sh as in shine.	th always like those letters in hothouse.
ng pronounced like ng in singing.	gn̄ an indescribable nasal sound.
c is never used by itself, but in combination with h to express the sound of ch in "Church."	

Diphthongs.

æ pronounced like "Aye."	ai pronounced like ai in aisle.
ao has the full sound of both letters.	áu has the full sound of both letters.
ei pronounced like i in "mite."	ii pronounced like ei in "being."
oi ditto oi in "oil."	vi almost like "we."
eu as eau in beautiful.	ou as ou in bounty.

In other combinations of the vowels, they have each their full sound, the first being generally grave and the second short.

NOTE—The Manipoorie and Cacharee languages have a written character of their own, both derived from the Bengali. But none of the others have any written form whatever.

Comparative Vocabulary of some of the various languages

<i>English.</i>	<i>Manipoorie.</i>	<i>Cacharee.</i>	<i>Kookie.</i>	<i>Arúng Naga.</i>	<i>Gnámi Naga.</i>
Fire	Mei	Wai	Mei	Mí	Mí
Water	Ishing	Dí	Tui	Doi	Zú
Earth	Laipák	Há	Lai	Gudei	Kathi
Air	Núngsit	Bár	Hooi	Inkai	Thikha
Sky	Nidhoripak	Nakhásou	Vánpi	Tinkim	Keruké
Cloud	Laichil	Hádí	Mei	Tingroi	Kenshoo
Fog	Laichin thába	Goál	Mei	Komó	Bhooncha
Smoke	Mei khoo	Wai khúdi	Meikhoo	Míká	Mikho
Sun	Númit	Sáing	Ni	Tingnaimek	Naki
Moon	Thá	Daíng	Lha	Hékéú	Thirr
Star	Thó mucha	Hátrai	Ashi	Higgí	Themú
Lightning	Nóng tháng	Sarápthei	Kólaphé	Higgí geo	Khésija
Thunder	Nóng khóngé	Gároomba	Váninge	Tinkim pokó	Tisé
Rain	Nóng	Hádí [der]	Gó	Ting roi [neo]	Terá
Rainbow	Chúm tháng	Jeng long má-	Toghui	Inkei va	Temú
Mountain	Ching	Hajoo	Ching	Rihí	Chikha
Plain	Tumpa	Hádi rají	Phai	Déje kui	Mejoo
River	Tárél	Diboo	Tui dúng	Gneo kí	Kerr
Jungle	Náruk	Hágra	Humla	Nam kang	Nha
Stone	Núng	Lónthai	Shong	Jú kang	Keché
Wood	Sing	Bón	Thing	Shíng	Si
Gold	Suna	Gujao	Lángkecha	Kuchák	..
Silver	Loopa	Goophoo	Danka	Gofoo	Raka hurr
Iron	Yót	Sér	Thík	Hegei	Théjírr
Brass	Pithrai	Fitlai	Shúmeng	Hutákei	Rení
Copper	Kóri	Támai	Shúmshun	Hutálo	..
Day	Númit	Sáing	Ni	Nai	Ja
Night	Ahing	Hór	Jing	Ting mooi	Ti
Year	Chahí	Meithei	Kúm	Kún	Chi
Month	Thá	Daíng	Lha	Kéú	Kre
Light	Mañgál	Junábí	Ava	Léba	Krevi
Darkness	Anumba	Andár	Ajing	Múida	Kremhoo
God	Lai	Madai	Puthén	Hurá	Durhoma
Demon	Shuroi	Hasong	Hilo	Ghumpéo	Medovi
Man	Mi-Nipa	Subung	Mi	Jai maná	Ma
Woman	Núpi	Masainjoo	Númei	Mi púi	Thenúma
Boy	Angángnipa	Ancha	Chapung	Hená mí	Nichúma
Girl	Augáng núpi	Masainjú an-	Chanoo	Hená púina	Theninomá
Animal	Shá	Mí [cha]	Ghunhing	Mákou	Nhatshe
Bird	U'chék	Dau	Vacha	Hinrooi	Pura
Insect	Til	Yí oong	Ghunhingcha	Inkét	Khuno
Friend	Marúp	Káfiyúng	Ghól	Gnai	Kenuma
Enemy	Lál	Ángko naislé-	Ghál	Gnougailuk	Nosó
Father	Ipá	Bába [ába]	Pa	Apéo	Apú
Mother	Imá	Mámá	Noo	Apúi	Azó
Brother	Nao	Dáda	Náo	Así	Shajou
Sister	Ichém-Ichul	Bíbí	Naonoo	Así púi	Lúpú
Son	Ichá	Busa	Pushul	Aná	No
Daughter	Ichánúpi	Bússo	Pushulnoo	Aná púi	Ponoije
Elephant	Sánoo	Miyúng	Saipi	Supó	Choo
Rhinoceros	Gunda	Genda	Chulki khat	Kúnda	Kedéh
Buffalo	Iroi	Misip	Silo	Gubni	Rili
Methin	Sundung	Míthung	Shél	Bui sáng	Húi
Cow	Sul	Músso	Silát	Kútóm	Mithoo

spoken on the Eastern Frontier of Bengal.

<i>Old Kookie.</i>	<i>Meekir.</i>	<i>Remarks.</i>
Mei	Me	All similar.
Tui	Lang	Compare old and new K. and Aroong Naga.
Runeng	Long le	Compare Man. new K. and Meekir.
Ikshi	Túmon	
Riván	Shineng	Old and new K.
Shoom	Arv��	
Ramikhoo	Mih��	
Meikhoo	I��h��n	Man. Cach. new K. Ar. Gna. and old K.
In��	Arn��	New K. old K. and Meekir.
Ithlh��	Cheklo	Man. new K. and old K.
Arsh��	Cheklo long	Old and new K.
K��l��f��e	Herai [sho	Ditto.
Kh��ri	Seneng	
Ar�� el	Arv�� [reng	Old K. and Meekir.
Nishumj��l��	M��ukat	
Rum	Ilong	Man. new K. and Gnamie.
Arij��l��	H��d��i h��w��r��	Man. and new Kookie.
Tui d��ng	L��ng roi	Man. new and old K.
Rumilha	Inum	New and old Kookie.
Sh��ng	Arlong	Man. new K. old K. and Meekir.
Thing	Theng	Man. new K. Ar. old K. and Meekir.
R��ngke chuk	Hon ��r	New K. Ar. and old K.
Sh��m ch��ng	Hon iok	Cach. and Ar. Man. and Hind.
Ch��ng ch��	Iachin	Man. and Cach. and Mee. old and new K.
Sh��m eng	Pitoi	Man. Cach. and Meekir. Hind. old and new Kookie.
Sh��msh��n	Taman	Old and new Kookie. Cach. and Meekir. Hind.
Ni	Arni	New K. Ar. old K. and Meekir.
Jing	Ajo	Man. new K. and old K.
K��mka	Ni kunshi	New K. and Ar. and old K. Man. and Gnamie.
Ithlha	Chi klou you	Man. new and old K.
V��r	Thikl��kl��r��	New K. and old K.
Am��k	Intingong	Cach. Hind.
Puth��n	Arnam	New and old K.
Khor��	Hi ��	
M��	Ar l��ng	Man. new K. Gna. and old K.
N��pung	Ar los��	Man. new K. and old K.
Naipung	Oso	Man. and Cach. new and old K.
Nait��	Arlos�� oso	Cach. and old Kookie.
M��rbing	Th��o	Man. new K. and old K.
Iv��	Vo	
Thungth��m��	Inth��n	
R��l��	Korte	New and old K.
R��l��	L��ngseletong	Man. new and old K.
Pa	P��	All.
Noo	Ipei	Man. and Cach. Ar. and Meekir old and new K.
Nai	I��k	Man. old and new K.
Oonai	Ingyirpi	
Rothur	Neso p��	
Dongma	Niso pi	
Sai pui	Inur	Man. new K. Ar. and old K.
Gonda	Gendoo	All except new K. Hind.
Siloi	Chelong	Man. new and old K.
Sh��tuk	Chai	
Sir��t	Ch��inong	Man. new and old K.

<i>English.</i>	<i>Manipoorie.</i>	<i>Cacharee.</i>	<i>New Kookie.</i>	<i>Aroong Naga.</i>	<i>Gnámi Naga.</i>
Horse	Sagól	Górai	Sakol	Hokón	Kirr
Goat	Huméng	Búroon	Kél	Kim é í	Tunoo
Tiger	Kei	Misí	Hoompi	Rág di	Tukhoo
Bear	Sawom	Músú boorma	Voompi	Hoogoom	Thaghá
Leopard	Kajéngla	Misi hátrai	Kám kei	Iurrea kou	Kékhí
Monkey	Yong	Maúksa	Jong	Sozó	Takui
Hog	Ok	Honó	Vo	Kubák	Thavó
Dog	Hwí	Sisa	Wicha	Settei	Thafú
Cat	Houlóng	Alú	Méngcha	Miyou na	Lenó
Rat	Oochí	Mojó	Jeu cha	Suzá	Thejeu
Porcupine	Subou dém	Midí	Sukoo	Ting oñ	Soké
Badger	Nó ok	....	Nulváng	....	....
Eagle	Khurung	Douling hákri	Moo	Killé	Kujoa
Peacock	Wahóng	Doudai	Vahóng	Wí éng	The vo
Crow	Kwák	Dou kha	Váa	Iíng kák	Jekho
Hen	Yél	Dou nô	A'	In rúi	Thevú
Toncan	Láng mei	Dou yúng	Vapól	Keré	Tephoo
Fish	Gná	Ná	Guña	Suka	Kno
Alligator	Goriál	Gérai	Olé	Hutchá	Khoggra
Lizard	Choom	Shoréma	Tung	Tim póng	Kho ta vo
Crab	Wai khoo	Khang krai	Aé	Hugga	Khóhi
Snake	Lil	Juboo	Gool	Hin neo	Tin hí
Centipede	Náchul	Yung grema	Chin ling	Ting numba	Zurr
Earth-worm	Thintou	Háni júboo	Tungtéł	Dei neo	Phi kwe
Caterpillar	Kúnjméng	Yooma	Língmúl	Ting óm ba	Khúdo
Butterfly	Kúrák	Dáma	Péng pelep	Im péng ba	Sopvo
Fly	Hai yíng	Thámpí ma	Thou	Tamaina	Thevi
Mosquitoe	Káng	Thám pi	Thou shi	Tamai	Sheré
Beetle	Ching thao	Jugai	Téng te	Kuzui	Ti lí
Ant	Kukchéng	Khai sing ma	Shími	In tiá wa	Thobe
White ant	Lai shou	Thelem hoori	Lai kha	Kaching na	Mha che
Head	Mokó	Khoró [ma]	Loo	Mi pei	Uchú
Body	Musa	Sáo	Apúm	Mi púm	U'mo
Legs	Khóng	Ega	Kéng	Mí pí	U'phi
Arms	Khút	Yao	Khút	Mí vá	U'boo
Face	Mai	Mú kháng	Mai	Mí joo	U' ze
Neck	Gnuuk shum	Godó	Kungón	Mi ghóng	Uvó
Back	Nungul	Síma	Tóng tun	Mi ching	Uché
Belly	Púk	Hó	Óí	Mi búng	U'va
Shoulder	Léngbál	Phao krúng	Lein kou	Mi kai	Ubukhe
Hips	Ning jón	Yátóng	Kong goo	Mi kúa	Ute
Chest	Thapák	Khabou	Op	Miga	Umerr
Waist	Khowáng	Jéng khóng	Kóng	Mikia	Uchecha
Eyes	Mit	Moo	Mit	Mi mík	Umhí
Ears	Na	Kumáo	Bil	Mi kou	Uneu
Mouth	Chil	Khú	Kum	Mi moo i	Ume
Nose	Na tól	Goong	Ná	Mi néo	Unheu
Lips	Chimbál	Khújér	Né	Mi mui jo	Ussó
Cheeks	Khajai	Khou lai	Béng	Mi biya	U'je
Chin	Khadáng	Khoosga	Khá	Mi gudang	Umekheu
Teeth	Yá	Hátai	Há	Mi geo	Uhoo
Hair	Shum	Khanai	Shum	Mi tám	Uchitha
Beard	Koi	Kham phor	Khámúl	Mi mui mai	Umékhú ma
Moustache	Koi	Ditto	Múmúl	Mi mui ma	Utuma
Navel	Khoe	Khot mai	Lai	Mi tula	U'ló
Elbow	Khút ning	Yá úskóng	Tong boo	Mi sao	Ubúthoo

<i>Beteli Old Kookie.</i>	<i>Meekir.</i>	<i>Remarks.</i>
Sakor	Lósai	Man, new and old K.
Kél	Bí	Old and new K.
Ikei	Téké	Man, old K, and Meekir.
Ivom	Thó wám	Man, new K, old K, and Meekir.
Ikei	Bong kroi	Old K, and new K. See tiger.
Ijong	Thé rou	Man, old and new K.
Vok	Phák	Man, new K, Gna, and old K.
Wíte	Mathán	Man, old and new K.
Iméng	Méng	New K, Ar, old K, and Meekir.
Jeute	Phiú	Man, new K, Gna, and old K.
Saphe vok	Yokhi bongom	New K, and Gna.
Sumai tha	....
Varháng	Ghomoo so	
Tokrai	Oráam	Man, new K, and Ar.
Vá ák	Okák	Man, new K, Ar, old K, and Meekir.
Ár	Wo	New and old K.
Pool ráng	Wo trung	
Igná	Wók	Man, Cach, new and old K.
Ové	Temong	Old and new K.
Surtung	....	Man, and Cach, Hind old and new K.
Iáe	Che he	Ditto.
Rool	Pheroi	Ditto.
Rití	You bohoo	
Sheníl	Roi chi he	
Lhóng múl	Inke	Old and new K.
Phelép	Inki ple ple	New K, Ar, old K, and Meekir.
Ithoi	Chi tím	Cach, and Ar, new K, Gna, and old K.
Phirse díp	Tim krang	
Tleng tlér	Inkét	Old and new K.
Thoi chím	Misó	
Bung ba	Phelong	Man, and new K.
Loo	Iphoo	Old and new K.
Chúmpúm	I bang	New K, Ar, and old K.
Tiké	Kéng.	Man, new K, and Meekir.
Bán jung	Ri	Man, and new Kookie.
Mhai	Maháng	Man, new K, old K, and Meekir.
Or	Sithok	Man, new K, Ar.
Búk	Inoong	Man, and Meekir.
Phoom	Ipok	Ditto.
Dar búl	Ipzáng	Man, and new K.
Khél	Kéng thám	
Táng	Ining	Man, Cach, new and old K.
Kong	Ívám	Man, new K, Ar, old K, and Meekir.
Mít	Mék	Man, Gna, and Meekir.
Kúr	Inó	
Bai	Ingho	
Nár	Ino kan	Man, new K, and old K.
Nir	Intoor	New and old K.
Ri kí	Ing óm	Man, new K, Gna, and old K.
Kha	Bíp	Ditto.
Ha	Isso	Man, new and old K.
Shum	Choo	New and old K.
Kha múl	Imoom	Ditto.
Nur múl	Moom athá	Ditto.
Lai	Chété	
Ikí	Retung de	

<i>English.</i>	<i>Manipoorie.</i>	<i>Cacharee.</i>	<i>New Kookie.</i>	<i>Aroong Naga.</i>	<i>Angami Naga.</i>
Wrist	Khút jéng	Yao khadú	Khút gnóng	Mi bángoa	U búche
Hand	Khút pák	Yao	Khut páung	Miba	U bijú
Thumb	Khút bi	Yao síma	Khút pi	Júng pui	U bi kírr
Finger	Khút ól	Yao sí	Khut júng	Mi bak rang	U bichena
Nail	Khút jin	Yao skoor	Tin	Mi chin	U bíche
Thigh	Phai gul	Ya khí tú	Phei pi	Mi ne	U dó
Knee	Khú oo	Yaskoo	Kúg boo	Mi kúkból	U kúja
Calf	Khú bom	Yaskoo ní bukhla	Tungai	Mi pi	U phicha
Ankle	Khú jéng	Ya gúng to	Akhoomit	Mi hi mik	Uphi mi
Foot	Khúng pa	Ya pha	Kéng pang	Mi pi pa	Uphi jú
Toe	Khóng tol	Yá si	Keng	Mi pi karung	Uphi krú
Penis	Tí	Lí	Jung	Mi shung	Uthó
Testicles	Túrm	Li dou di	Nilit moo	Mi tinka	Utjú
Vulva	Thoo	Shifou	Shoo	He moo	Pomé
Anus	Thúl	Khi foo	Tó	Mi roong ki	Ponú
Paps	Khóm	Abó	Noi	Mi túm	Unoo
Skin	Ool	Bugoor	Vún	Begai	Ujen
Bone	Surroo	Bégréng	Goo	Pura	Uroo
Blood	I'	Thí	Thí	He zai	Thuza
Horns	Sují	Bogróngh	Kí	Bucheo	Póka
Wings	Musa	Bugráng	Alhá	Pukun	Poshen
Feathers	Mutoo	Gráng sí	Va mál	Pukun kut	Poma
Tail	Mumei	Bérmai	Amei	Pímí	Pomí
Trunk	Munától	Búsoodi	Amol	Mui jóá	Pon hiech
Claws	Khúng úl	Yauskoor	Kéng	Mín chin	Popí che
Hoof	Khú jin	Yauskoor	Kéng	Pánchin	Pomoo
Tusks	Mayá	Bala tai	Aha	Begin	Pohoo
Hind leg	Khúdúng	Yahougni biá- ga [ga	Anúng kéng	Bepí	Pophí
Fore leg	Khúmáng	Sagungni biá- Bóng pháang	Ama kéng	Bebá	Pop boo
Tree	Upál		Thing le	Ching bang	Sibo
Root	Mará	Yádér	Thing júng	Pamá	Pómi
Branch	Masá	Bedép	Aká	Bekei	Poche
Leaf	Maná	Pulai	Ná	Puneo	Pon nieu
Fruit	Mahí	Buthai	Thing gá	Vichí	Rossi
Flower	Lei	Bobár	Pa beng	Be pá	Na phoo
Bud	Lei apóm̄ba	Bothorai	A meom	Vichinoo	The bé
Creeper	Úrí	Dúkha	Khao vui	Bung rui	Kerre
Mango	Hai nou	Thei joo	Hai	Ba chi	Merro
Plantain	Lapoi	Thei loo	Mót	Rangón ji	Nhási
Jack	Thei bóng	Thei fi oong	Lám khong	Tujóng ji	....
Bamboo	Wá	Wá	Gó	Inria	Kurra
Cane	Lí	Rái	Tai ting	Rehát	Kurré
Cotton	La sing	Khoon	Put jám	Ka lung	Chochha
Paddy	Phou	Mái	Cháng	Cheo	Tulha
Rice	Cheng	Mai róng	Cháng cháng	Hebi	Sikko
Cucumber	Thubí	Thei smoo	Chung mai	Ga pha	Chottó
Pumpkin	Khúng dúm	Khao khúloo	Oom nou	Hemána	Cho pá
Bengan	Kha miél	Phántheu	Dádil	Intookehi	Kíkhéu
Indian corn	Chúg já	Mai mugh lai	Kól boo	Mitak	Jaro sí
Yam	Há	Thasfile	Há	Kebei	....
Potatoe	Aloo	Tha	Báha	Herou	Raphé
Dál	Hawai	Subai dail	Havai	Dail	Dáli
Capsicum	Morek	Múrsai	Mulcha	Ráchi	Chesi
Tobacco	Hi ták	Duma bulai	Dúnmóm	Inkeo neo	Khopirr

<i>Old Kookie.</i>	<i>Meekir.</i>	<i>Remarks.</i>
Musoi	Ri kán	Man. and new K.
Khút ja	Ri pa	Man. new and old K.
Khútpui	Ri mún pi	Ditto.
Khútchul	Ri ki mún	
Khútteu	Ri chi mi	Man. new K. and Ar.
Il	Keng tham	Man. and new K.
Rakhúk	Keng koo	All.
Phei rai	Kengsár lí	
Ar tui	Keng ar kong	
Phei ja	Kéng pak	Man. and new K. and Meekir.
Pui	Kengchúmoon	New K. and Meekir.
Jung	Chelék	Man. and Cach.—new and old K.
Kétílroo	Búmutti	Old and new K.
Shoo	Mák	Man. new and old K.
Pinta bing	Hidum	
Arnoo	Mok	New K. Gna. and old K.
Vún	Areng	New and old K.
Roo	Rípi	Man. new K. Gna. and old K.
Thí	Arí	All.
Rakí	Anoo	Old and new K.
Va pól	Arréng	
Tórai	Ipák	
Vajún	Armé	All, except old K.
Rha móu	Izáarakove	
Rhamú	Tekea chimi	
Phei tin	Abót	
Ha	Inerer sho	Man. new and old K.
Anung ke	Akéng ti	
A'ma ke	Akengaphrang	
Thing lér	Théng pi	New K. old K. and Meekir.
Thing re júng	Angkoor	New and old K. Man. Ar. and Gua.
Thing et rung	Aró	
Ná	Arvó	Man. new K. Ar. Gna. and old K.
Thing rá	A thé	New and old K.
Pár	Ang phár	Cach. new K. Ar. old K. and Meekir
Rhemoom	Athè so	Old and new K.
Leishung	Ri káng	Man. new K. Ar. and Meekir.
Thai hai	Thár ve	Man. new K. old K. and Meekir.
Ri mó	Ping hoo	New and old K.
Lán khóng	Yang phong	All.
Ró mai	Chék	Man. and Cach.—Ar. and Gna. old and new K.
Tíng	Prí	Cach. new K. and old K.
Chon	Phé ló	Cach. and old K.
Fáng	Shók	New and old K.
Ifai	Sháng	Man. new K. and Meekir.
Fung mát	Thoí té	
Tui oom	Bong hom	New and old K.
Munta	Hép pi	
Vai mím	Théng te	
Burha	Hén	Man. new and old K. also Cach. and Meekir.
Bál	Phiroi	Cach. new K. and old K. Man. Hind.
Fúvai	Chophe	Man. new K. and old K. Cach. Ar. and Gna. Hind.
Mircha	Bérík	
Dúma	Dúmár wo	Cach. new K. old K. and Meekir.

<i>English.</i>	<i>Manipúrie.</i>	<i>Cacharee.</i>	<i>New Kookie.</i>	<i>Aroong Naga.</i>	<i>Angami Naga.</i>
Pán	Pana	Mithi	Pán	Mithei	Mi thé ni
Betel-nut	Koá	Gó ai	Thing mulcha	Jekwaji	Rubó si
Turmeric	Jéngung	Sú loodi	Ayéng	Roornai	Vichoo
Onion	Tilou	Sá lung	Phúloon	Tingra	Shemeré
Reed	Shing út	Khukri	Phai	Umbou	Bhóti
Grass	Napi	Sám	Umpa	Reheo	Nha
Bark	U'koo	Búgoor	Thing hó	Ching gei	Sibó
Husk	Wai	Jí jai	Ho	Kapai	Pekhí
Juice	Mei hí	Bidí	Thei tui	Budooi	Kakhe
Gum	Lei nup	Athá	Thing nai	Insongdui	Sicha
Cultivation	Lou	Phudaing	Lou	Loo	Lé
Flesh	Ma shá	Mógong	Shaphé	Himei	Thémó
Fat	Ma háo	Buthao	Shathao	Pacha	Posse
Oil	Thao	Thao	Sathao	Pathao duí	Gákri
Salt	Thúm	Sém	Chí	Inchai	Mécha
Milk	Sung om	Musúng gidi	Noi tui	Katúming duí	Mí túna jeu
" Shiráb"	Yoo	Joo	Joo	Jáo	Juháro
Boiled meat	Sha thóngé	Songba	Sha hón sa	Gi láng looba	Thémó gha
Roast meat	Sha yaire	Yao ba	Sha kasangta	Buzai	Thémó lí
Broth	Sha írí	Rúba	Sha tui	Kaláng ba	Ghá jú
Rice, cooked	Chák	Makhum	Boo-An.	Tuk	Té
Eating vessel	Púkhum	Jíbani bostú	Kong	Teorába	Mekhó
Drinking ves-	Khújai	Lúng báni bos-	Bél	Sagrába	Ketto
Ladle	[sel] Khabai	Khao khú [tú]	Khuk ke	Hettia	Lívú
Ivory	Sámu mayá	Míyoong hátaí	Sai ha	Hipo akim	Chooohoo
Wax	Khoi roo	Brés lai	Khói loo	Taghá	Mekwi bó
Village	Khúl	Nó lai	Khó	Koló	Nírá
House	Yím	Nó	In	Kí	Kí
Door	Thóng jil	Dér gá	Kót kha	Kumái	Ki khá
Window	Mi hút	Dérgá sa	Kót cha	Kumni poina	Kikhá kachú
Mat	Phuk	Yám	Jam phil	Ka sing	Chópra
Basket	Thúmo	Kháng kra	Bing	Pura	Khódi
Box	Upoo	Sundúk	Tá k hoop	Ching kók	Goozó
Bag	Kháo	Jóli	Dip-Khaodip	Cheka	Lókho
Cloth	Phí	Rí	Pon	Pai	Khwé
Spear	Tá	Jóng	Téngcha	Hengeo	Ruigoo
" Dhaoo"	Tháng	Sísoong	Chem	Hekké	Zhé
Knife	Hij rang	Khutari	Chemcha	Kepoina	Júkhina
Bow	Lirúng	Jilí	Gophel	He boina	Jilí
Arrow	Tél	Bula	Thul	He hoina too	Thil rá
Shield	Chúngói	Phí	Lúm jém	Ing gei	Pezú
" Pánjies"	Shou	Makhou	Shou	H-tooo	Kethié
Musket	Núng mei	Hílai	Mei púm	Higí mi	Mi shí
Poison	Hoo	Bish	Thulun	Inkai	Therri
Boat	Hi	Roong	Kóng	Nei kwo	Roo
Coffin	Koo	Mi roong	Lhan khoo	Kachin kwo	Mó koo
One	Amá	Másí	Khut	Kut	Po
Two	Ani	Máguni	Ni	Kaná	Kana
Three	Ahoom	Mág thám	Thúm	Kachúm	Se
Four	Mari	Mabré	Lí	Madai	Da
Five	Mañga	Maboñga	Nga	Miíng ou	Peñgoó
Six	Taruk	Mado	Goop	Sherük	Shúroo
Seven	Taret	Ma sní	Suggi	Siná	Thena
Eight	Nipál	Ma jai	Get	Tisat	Theta
Nine	Má pal	Ma skoo	Kó	Sikoo i	The koo
Ten	Tará	Mají	Sóm	Kerou	Kerr

<i>Old Kookie.</i>	<i>Meekir.</i>	<i>Remarks.</i>
Rum pán	Bíthi	Cach. Ar. Gna. and Meekir. Man. new and old K. Hind.
Tát pung	Kóve	Man. and Cach. Hind.
Ai shél	Thár mit	Man. and new K.
Korporoon	Arsún	
Phai vó	Inkor	New and old K.
Lhoi	Báp	
Thing hok	Ahoo	New and old K. and Meekir.
Hoo	Phéke	New and old K.
Thei toor	Alang	Ditto.
Thing tui	Aphík	
Loi	Rít	Man. new K. Ar. Gna. and old K.
Sa	Ok	Man. new and old K.
Sa thai	Athoo	Man. Cach. new K. and old K.
Sa thai	Yáng thoo	Man. Cach. new K. Ar. and old K.
Chi	Intí	New and old K.
Rumutoi	Moghláng	
Zukoo	Hor	All.
Ámhin sa	Og toon	
Sa kin it tak	Karmoo	
Sa tui	Ki oop	Old and new K.
Boo	An	New and old K. and Meekir.
Mai ráng	Chó hummoo	
Khéng bél	Jún hummoo	
Hai ho	Lúm hor	
Sai ha	Inár aso	Man. Cach. new K. and old K.
Khoi loo	Jó ir	Man. new and old K.
Khó	Rong so	Man. new K. Ar. and old K.
In	Hém	Man. new and old K. Ar. and Gna.
In kot	Iháp	New K. Gna. and old K.
Nompai	Ihápsó	New K. and Gna.
Jamphir	Tar	Cach. new K. and old K.
Rebing	Hák	New and old K.
Shúmdup	Píra	Cach. and old K. Hind.
Shúm kop	Jámlí	Man. and new K.
Poon	Pé	All.
Ifei	Chirpla	Old and new K.
Chem	Nukpa	Cach. old K. Meekir. and Hind.
Katouri	Tári	Man. Cach. and Gna.
Thul pui	Thai	Man. new K. Gna. and old K.
Thul	Lip lha	Man. and Meekir.
Ipho	Chóng	Man. Cach. and new K.
Pai fúng	Káng hoo	Cacharie and Meekir. and old K. Ar. and Gna.
Silai	Hílé	Cach. and Meekir. Hind.
Toor	Bí	All, except Meekir.
Ri koong	Télong [koop	All, except old K. and Meekir.
Túm	Telong puchi	Man. and Cach. new K. Ar. and old K., Meekir and Cach.
Khat	Hisí	All.
Nik	Hi ní	All, except Gna.
Thúm	Ki thóm	All, except Ar. and Gna. and those together.
Li	Phi lí	All, every one nasal.
Raṅga	Phaṅga	All, except Cach.
Irook	Therok	Cach. and Ar. old and new K.
Surri	Theroksi	New and old K.
Riét	Nér kép	Cach. new K. Ar. Gna. and old K.
Ikók	Sir kép	Old and new K. Ar. Gna. and Meekir.
Sóm	Kép	

<i>English.</i>	<i>Manipúrie.</i>	<i>Cacharee.</i>	<i>New Kookie.</i>	<i>Aroong Naga.</i>	<i>Angami Naga.</i>
Eleven	Tará ma thoi	Mají se	Sóm le khut	Kerou ka keo	Kero po
Twelve	Tará ni thoi	Maji ní	Sóm le ní	Keroushekena keo [chum]	Keró kana
Thirteen	Taráhoom thoi	Majig thum	Sóm le thúm	Kerou she ke-	Kero se
Twenty	Kool	Ma khon	Sóm ni	Ng kai	Mekoo
Thirty	Kúnthra	Ma túm ji	Sóm thúm	Hém rou	Serr
Forty	Niphoo	Biság ni	Sóm lí	Hed ai	Lhí da
Fifty	Yáng khai	Mádán	Sóm ñga	Reng éo	Lhi peñgú
Sixty	Hoom phoo	Biság tám	Sóm goop	Deghro	Lhi shúroo
Seventy	Hoomphútará	Biság tám maji	Sóm suggi	Dek shi ná	Lhi thena
Eighty	Mari phoo	Bisábri	Sóm gét	Dek ti sat	Lhi theta
Ninety	Mari phútará	Bisábri ji	Sóm kó	Dek si kui	Lhi thekoo
A hundred	Chámá	Ruza si	Za khut	Hai	Kra
A thousand	Lisiñg amá	Rizing si	Sháng khut	Chang	Kra kerr
A half	Makhai	Gujé shi	A kim	Pam pi	Téta
I	Ei	Ang	Kei	I'	A
Thou	Nung	Noo	Nung	Nung	No
He, she, it	Ma	Bo	Hi-Khú	Wi	Loo
We	Ei khói	Júng	Kei ho	Anui	U'ko
Ye	Nung khói	Nurao	Nung ho	Nung nui	Neko
They	Ma khói	Burao	Hi ho	Wi nui	Lúko
Mine	Ei gi	Ani	Kei ma	Agoo	Ave
Thine	Nunggi	Nooni	Nung ma	Nung goo	Nove
His	Magi	Bóni	Hima	Wi goo	Lúve
Ours	Ei khói gi	Júng ní	Kei hó a	Anui goo	Ukove
Yours	Nung khói gi	Nuraoni	Nung hó a	Nung mu goo	Nekove
Theirs	Ma khói gi	Buraoni	Hi hó a	Wi niu goo	Lukove
Who	Kunáno	Séré	Koi	Chow lo	Sópo gha
Which	Kuri	Súmoo	Koi-I'	Indai	Kaji bo
What?	Kuri	Súmoo	I'	Indai	Kajibo
This	A shí	E'bo	Hi	Aida	Hou
That	A dú	Hou bo	Hú	Wida	Loo
The other	Ama sung ama	Hobogú bun	A dung	Clí je ma	Kagrí
Any	Khura	Isaba	Thim khut	Dai ko	Kékri
All	Púmña puk	Krúg bo	A bon	Chi je kum	Mha poi
North	Awáng	Ootur	Lum shoo	Dui mi	....
South	Mukha	Dukin	Lum tou	Dui ro	....
East	Nóng po	Sain ja	Sá lum	Kapé peo	....
West	Nóng chúp	Sain juróba	Lhung lum	Keowai peo	....
Right	Yét	Yáoda	Chang lum	Hezut	Uj á tha
Left	Oi	Yáo si	Vei lum	Ih	U ví cha
Far	Arápa	Jaing bí	Ghum chéng	Deoda	Cha cha
Near	Nuglé	Chámpa bí	Nai cha	Ná da	Jeu
Long	Ashángba	Lou bí	Sao pi	Té da	Kacchha
Short	Téle	Soon thé bi	Chóm sa	Katé rúnda	Ka jeu
High	Wángé	Joo bí	A shángé	Hooda	Kurke
Low	Néme	Hí bí	Ném cha	Na bí da	Kur no
Much	Yáme	Báng bi	Tum pi	Kéda	Krápaze
Little	Yám de	Báng ya lai	Tóm sa	Chumda	Kadú cho
Great	Chou ba	Dé bí	Alín	Dí da	Kat hekiyé
Small	Apí sa	Khasébí	Néo cha	Cheida	Ka chí
Good	Apha bá	Humbí	Apha é	Yda	Kavi
Bad	Phutte	Hum ya	Aghilou ó	Shiá da	Kasó
Broad	Marák	Wárbi	Avai	Bakundi da	Merró
Narrow	Marák piye.	Warya	Avai úmpoi	Bakun chei da	Ka jeu cha

<i>Old Kookie.</i>	<i>Meekir.</i>	<i>Remarks.</i>
Sóm lei khut	Kresi	
Sóm lei nik	Kre ni	
Sóm lei thúm	Kréga thom	
Sóm nik	Ing koi	
Sóm thúm	Thóm kep	
Sóm lí	Phili kep	
Sóm Rañgá	Phóngo kep	
Sóm irook	Therok kep	
Sóm surri	Therok si kep	
Sóm riét	Therok ner kep	
Sóm i kók	Therok sir kep	
Rizá	Pháró sí	Cach. new K. and old K.
Shanka	Soori si	Man. and Cach. new K. Ar. and old K.
Ari kip	Achitím	
Kei	Nge	Man. new K. Ar. Gna. and old K. Cach. and Meekir.
Nung	Nung	All.
Khú	Náng	New and old K.
Kei ma ni	Nge túm	Man. new K. and Gna.
Nungmani	Nung túm	Ditto.
Khú mani	Náng túm	Ditto.
Keimarthung	Ngé li	
Nung marhung	Nung li	
Khú marhung	Náng li	
Keimani	Nge túm li	
rhung [rhung]		
Nungmani	Nung túm li	
Khúmaní	Nang túm li	
Tú pei [rhung]	Mád lo	
Tú	Po Pi lo	
Ím	Pí	Old and new K.
Kha kha	Láhe lo	
Khú a kha	Ha lá he lo	
Idung	Halá kapré	
Achín tek	Athungaathung	
Aréng kun	Habadoo	
Lum in théñ	Ní rép	Cach. Hind.
Lum tou	Ne rép	New and old K. Cach. and Hind.
Ni sho ting	Ni hang	
Klai klák	Ni chi	
Chang lum	Aré	New and old K.
Voi lum	Arvi	Man. new and old K. and Meekir.
Rum mohl	Hi lo ving	
Kho nai	Ti bo kher	Man. new K. Ar. and old K.
Asai	Ding pi	New and old K.
Atoi	Thí het	
Ri sháng	Kung toi pi	Man. new and old K.
Ri ním	Thí ket	Ditto.
An tum	Ke óng pi	New and old K.
An rhoi	Angé	
Alien bák	Kithé pi	New and old K.
Achín	Bi hek	
Athut	Me ong	New and old K.
Thumake	Heñg ó	
Akhung	Thédoong	
Akhung o muk	Bi hék	

<i>English.</i>	<i>Manipoorie.</i>	<i>Cacharee.</i>	<i>New Kookie.</i>	<i>Aroong Naga.</i>	<i>Angami Naga.</i>
Straight	Chúme	Beléng bí	Ajáng pét	Kanjeida	Me jú
Crooked	Khóye	Be léng ya	Akon	Injeimada	Ruhái
Round	Akoeva	Giding loo loo	Aki kól	Bopúnda	Merrú
Square	Chithek mari	Goróng birí	Aning li	Kakémdai da	Poke chú
Old	Hanooba	Gurasa	Tésé	Gachi pao da	Pichú
Young	Nahá	Nága	Tung wál	Rahungda	Ki sa
Old	Hanooba	Gujám	Alui	Peréda	Ka só
New	A nou ba	Gudain	Atha	Kachi ba da	Kasa
Ripe	A mún ba	Goo moon	Ata	Kamewa da	Ros sí me
Raw	A sung ba	Gu thung	Ashéle	Kán gei ba	Memo lo
Sweet	A thúm ba	Díbi	A too ye	Ka kúm ba	Moo
Sour	A sin ba	Khabi	A thoo	Ka ká ba	Khú
Bitter	A khá ba	Me jér bi	A kha	Teo shi a ba	Khwéh
Hot	A sá ba	Doong bi	Asa	Ka tom ba	Lé
Cold	A ying ba	Gusain bi	A dup	Kagei va	Mé koo
Handsome	A phu ja ba	Majang bi	Apha munge	Kíva	Bí showe
Ugly	Suk thi ba	Nérgoo	Aphamung poi	Tunul eda	Mú showe
Fat	Ma hou	Dé bi	A thao e	Dída	Kajou
Lean	Mayáng kunge	Rám bi	Aghon ge	Ri da	Kache
Thick	....	Ru ja bi	Asáe	Sheo bi	Ka jú
Thin	....	Bábi	A páe	Hepeo le	Ka ché
Heavy	Arúmba	Ri sí bi	A gíe	Reta da	Meshisha we
Light	Ayáng ba	Ri jeng bi	Ajáng vél	Chá da	Med ja
Light	Ángál ba	Juná bi	Aváe	Pului da	Jábi
Dark	A mum ba	Juná ya	Ajingé	Lui shia da	Jásó
Hard	A kun ba	Rou bi	A tá é	Chida	Resú
Soft	A thot pa	Mi you bi	A néme	Noo da	Re mü
Sharp	Thouye	Boo bi	Ahéme	Lia da	Pol ri ví se
Blunt	Thoude	Boo ya	Amo le	Numbda	Polejé
Dear	Tán ge	Dorou bi	Aháe	Hilí chi da	Mháre bujé
Cheap	Honge	Lai bi	Abáye	Seo bi	Pomavishoe
Difficult	Chi le	Afut	Akhoe	Na tri da	....
Easy	Chinde	Humblei dúde	Abáye	Ibida	....
Clean	Añgo ba	Gúfoo	Añgoué	Hapong da	Mesá
Dirty	A motpa	Nér goo	Anéne	Tunule da	Kesho
Rough	Nández	Miliya	Ahume	Rui mi ma	Mehé
Smooth	Nále	Milibi	Anáme	Nei da	Nejú se
Strong	Kule	Hum bi	Aháde	Ki wuroon da	Zába
Weak	Sole	Bolgori	A doi e	Paranchi da	Pojújú
Early	Thúna	Sagung	Majépmín	Hinchonai da	Ji wurté
Late	Thengba	Yahoong	Agei ye	Namai da	Menovur
Wise	Yám singe	Akhol humbi	Achinge	Mina kída	Porbi
Foolish	A punge	Akhol giri	Añgole	Bi sui gále	Kemhoué
Merry	Noye	Malouba	Atotne	Hupatoule da	Depo lí simo
Grave	A suk pa	Malouya	Atot loue	Pa tou me ne	Deposísa we
Blind	Mitángba	Gána	Amitcho	Mikchiti da	Pomítche
Lame	Kong tekpa	Khora	Akeng bai	Cha a di da	Runga
Deaf	Napung ba	Natong	Anuñg oñige	Kón pung	Ponyieravo
Dumb	Lei rom ba	Ábrá	Apao moe	Pula shia da	De púiloho
Black	Amoo ba	Goosoom	Avum	Tigring	Kitti
White	Añgou ba	Goophoo	Abung	Hapong	Kikra
Red	Añgáñg ba	Gujaø	Ashun	Kuchák	Merí
Blue	Asung ba	Soom jli jli	Lí leng	Tigring ring	Losekwe
Green	Na pú	Ga khrung	Bongao eng	Gerou	Lomoo
Yellow	Yéng ung	Súloo delai	Ayéng	Injin	Thek koo
Be	....	Dong	Hín	....	....

<i>Old Kookie.</i>	<i>Meekir.</i>	<i>Remarks.</i>
Athloon thai	Kéng ong	
Koi	Keng ke	Man. new and old K.
Hulrhoom	Ching bar sít	Man. and new K.
Arh ki	Krong phlí	
Tur	Chár búra	
Lhung vál	Ríso	Man. and Cach. new K. and old K.
Alhui	Abarím	New and old K.
Athur	Akami	New and old K.
Iroo	Kemén	Man. and Cach.
Tuu make	Avei	Ditto.
Athai	Dokong	Man. new and old K.
Tai muk	Kho dát	
Num she	Thorong	Man. and new K. and Gna.
Alúm	Sodák	Man. and new K.
Adai	Kángsám	New and old K.
Athut rai	Doi vét tong	Man. and new K.
A shét ruk	Lángó	
In rai	The ong	Man. and new K.
Kong	Chúng kréng lo	Man. new and old K.
Alein ool	Arthát	
Achin ool	Arong	
Arik	Ardiyong	
Jág bai	Arjág tang	Man. new K. old K. and Meekir, also Cach.
Avár	Lok lán	New and old K.
Jána jing	Lok lén	Cach. new and old K.
Akhir	Ang tang	
Ar ném	Káng dúk	New and old K.
Añgai	Rhé ong	
Añgai muk	Rhé rhé	
Ari chung	Ador so ong	
Aol	Ador me ong	
Antak	Pákahoi ma	
Aol	Nong a me lo	
Arthéng	Kilop	Man. and new K.
Ánim	Hingo	New and old K.
Anthir	Ching bár be	
Anám	Ching bár lo	
Ar hut	Méchun	
Cho kino	Aboi aré	
Imhá kun	Aphrung	
Hong jám	Aphí	
Long thúloí	Aning a mé	Man. and new K. Cach. Hind.
An tlo	Aning lángo	New and old K. Cach. Hind.
Thú jerr	Chipinung	
Jer muk	Chipinung le	
Amitcho	Ameka silo	Man. new K. Ar. old K. and Meekir, also Gna.
Aoi	Kéng ko	Man. new K. and Meekir.
Ashét	Ano káng tong	Cach and Ar.
Bai bui	A lumave	
Avom	Aki í	New and old K.
Atík	A ki lo	
Ashin	Kér	New and old K.
Adum	Aki loo	
Arhing	Aki et	
Añgoi	Hon et	
Níng	Dám not	Man. and new K.

<i>English.</i>	<i>Manipoorie.</i>	<i>Cacharee.</i>	<i>New Kookie.</i>	<i>Aroong Naga.</i>	<i>Angami Naga.</i>
Remain	Lei o	Song	U'min	Mákre	Thello
Do	Tou o	Dáng	Bolin	Mateo lo	Síle
Live	Leikho	Tháng	Hing in	Ríng lao	Satahé
Die	Shíro	Thí	Thí in	Chei lao	Satalé
Eat	Cháo	Jí	Nén	Jeo lao	Chiche
Drink	Thou o	Loong	Donin	Sag lao	Kato
Sleep	Híbo	Thoo	I' moo in	Je lao	Zelé
Wake	Hougolo	Bájá	Kung in	Chú lao	Shé
Laugh	No o	Miní	Nooyin	Nui lao	Noo é
Weep	Kupbo	Gurá	Kupmin	Háb lao	Krá le
Speak	Haio	Jo	Shoiyin	Ráng lao	Poo le
Hear	Táo	Khoná	Gná jin	Sheo lao	Runí le
Know	Khungo	Booji	Héa	Chi lao	Sí we
Sing	Sao	Rija	Sán	Leo teo lao	Chálische
Dance	Jagoi sao	Bai	Lám in	Lém lao	Kareli le
Walk	Chulo	Hím	Kul sonin	Tul lao	Tosú le
Run	Ché lo	Khai	Tájin	Págħ lao	Ta lé
Fall	Túro	Gulai	Toon	Kou lao	Krichélē
Stand	Lébo	Song	Ding in	Sáb lao	Sé lé
Sit	Phumo	Khám	Touvin	Intao lao	Bá le
Want	Nio	Sain	Thoomin	Kerao	Ma chhále
Have	Tillo	Nai song	Moon	Peilao	Gnú le
Take	Lou o	Lá lá	Lán	Loo lao	Lé lé
Seek	Thio	Sumai	Holin	Peo lao	Phú le
Get	Khungo	Mei kháti	Moon	Dao dú mei	Gnú le
Give	Pí o	Rí	Pén	Pé lao	Chú le
Carry	Pú o	Láng hi tung	Chojin	Tei je ta lao	Pekho le
Bring	Púrú o	Laboo	Hin chojin	Tei wung lao	Pephíri le
Take away	Púrku	Láng	Lanchojin	Tei lo	Petá lé
Lift up	Thánga lao	Súgoo	Domin	Pésé lé	Tei joo lao
Put down	Thumo	Deng	Koi yin	Pejé lé	Kai lao
Cut	Yalo	Dá in	Sádin	Dú le	Bí lao
Tear	Shé to	Síjí	Loi e in	Pho le	Páng lao
Bite	Chi o	Wai	Pedoin	Mekiche	Inkí lao
Pull	Chingo	Súdúng	Lo jin	Mherású	Jupa lao
Push	Ilo	Hai gár	Shonin	Khúshú le	Hépa lao
Strike	Yai yo	Soo	Déng in	Vúchú le	Beo lao
Kill	Hato o	Dotai gár	Voli in	Vúra sátawé	Beo chán lao
Bury	Phum jilo	Phoob	Voo yin	Khrúawe	Bai lao
Burn	Thá o	Sao	Gou vin	Rewale	Roo lao
Love	Chá lo	Khusao	Doi yin	Ní shéwe	Pemi lao
Hate	Páng múnó	Naislé	Doi hi in	Animo yé	Gnou wai lao
Fear	Ki o	Khín	Kichán	Télé	Hing lao
Be angry	Sá o	Thám si baigo	Lúng sán	Poní mo le	Lúng púm lao
Quarrel	Khuno	Nám jí lai	Kina vin	Kaghí le	Hege lao
Steal	Húra lo	Khao	Goo in	Raghoo le	Huga lao
Buy	Lei o	Burai	Chon	Kri le	Lui lao
Sell	Yo lo	Phaing	Jo in	Zole	Jo lao
Work	Sú o	Koosi dung	Tong in	Bhán chi che	Ma teo ra lao
Play	Suno	Mulao	Ki káp miin	Thudo chi che	He pá teo lao
Depart	Chu lo	Thang	Chén	Tota che	Tacho lao
Come	Láo	Phai	Húng in	Phir che	Wáng lao
Arrive	Thungo	So tha	Túng in	Chole	Chang ne lao
Jump	Chongo [go]	Khai lung	Chom in	Too le	Pakchú lao
Hop	Khōngy chon-	Khære khre	Ki báj in	Reliye	Koihoine talao
Fly	Pai yo	Boor	Léng in	Parakhamá	Lém chu lao

<i>Old Kookie.</i>	<i>Meekir.</i>	<i>Remarks.</i>
Umrese	Kahóng ta	New and old K.
Thorese	Inhoinot	Man, and old K.
Hingro	Akireing do	New K. Ar. old K. and Meekir.
Thíro	Thi not	Cach. new K. old K. and Meekir.
Néng	Chólo	Man. Gna. and Meekir new and old K.
In	Júnón	
Rhumúng	I'non	New and old K.
Thungron	Thúr non	Man. new and old K.
Inui	Káng nek	All except Cach. and Meekir.
Ishun	Cheroo	Man. and new K.
Hil ro	Tha not	Cach. and new K.
Riúigai	Areu lo	New and old K.
Nar hé	Jinsonot	New and old K. Cach. Hind.
Hui jám	Ló not	Man. and new K.
Ilám	Chi dán not	New K. Ar. and old K.
Anóm	Dám	Man. Hind.
Herai	Kikát	New K. and Gna.
Kelir	Krep not	Man. and new K.
Iding	Kurjáp	New and old K.
I thúng rou	Kang ni	Ditto
Kur chok	Háng not	
Mútak	... ...	New and old K.
Va lur	E' not	All except Meekir.
Tag hám	Nép not	
Mútak	Long lo	New and old K.
Péro	Pi not	Man. new K. Ar. old K. and Meekir.
Achoi	E'ndum not	New and old K.
Húng lur	Vá non	
Choitero	Pó non	New K. and Cacharee.
Domro	Rúng not	New and old K.
Atul	Bí not	New K. and Ar.
Aleng	Thú not	
Atette	Mi sek pet	
Kis he	Korak	
Hai kair	Boong not	
Hai tín ro	Doinot	
A khong	Chók not	
Ahém	Doi het	
Pém púm	Kipíp	
Ei hál	Thú vók	
I dit ro	A ning do	Man. Cach. new K. and old K.
I dit muk	Ani lungo	
Kitti bák	Hi jim	
Aníng a think	Aníng kitthi	Man. and new K.
Ras hól	A chí voi	
In roo	Khang hoo	New K. Gna. and old K.
Choi	Nám non	Man. and Ar. new and old K.
Joi	Jór non	All except Cach.
Tirro	Akám do	
Ridai	Jui du nang	
Ro ró	Dám	Man. and new K.
Húngro	Wáng	New and old K. Ar. and Meekir.
Túng ro	Lé lo	Man. new and old K.
Ri tóp	Katung lo	Man. and new K.
A oi	Kung jár	
Vong ro	Pashi í	

<i>English.</i>	<i>Manipoorie.</i>	<i>Cacharee.</i>	<i>New Kookie.</i>	<i>Angami Naga.</i>	<i>Aroong Naga.</i>
Sneeze	A thikal o	Haisoo	Chín	Rathá le	Kátesei lao
Snore	Nakhó o	Goro	Na hámín	Zeme khró le	Panékwa lao
Fart	Moi thó o	Khiboo	Vei sun gin	Pavishú le	Imbilao
Belch	Thung geo	Hunglúma	Sai i in	Merú le	Tisatao
Cough	Lo kho ó	Goosoo	Khoon	Rokhú le	Inkhou lao
Whisper	Khoushélo	Musáb	Kihou goo vin	Kanipú le	Binbína lao
Bellow, Call	Kou ó	Rouhijeroo	Kou vin	Kési lé	Koosa lao
See	Yén go	Nai	Vén	Piché	Gnó lao
Ask	Hungo	Shoong	Dongin	Kuche phí le	Gneoga lao
Answer	Khúmo	Thi dí	Don bútnin	Dépoole	Rang pa lao
Bind	Púlo	Khádi	Kánin	Phále	Pi lao
Loosen	Thó o	Khooro	Lhumin	Pishú le	He phei lao
Smell	Namo	Mudoosnai	Ná in	Théng úle	Num ghai lao
I go	Ei chule	Ang thang nung	Ka ché	Ita rá ta	A phi jewe
Thou goest	Nung chule	Noo thang doo	Na ché	Nung ta ra ta	No phi jewe
He goes	Ma chule	Bo thang doo	A ché	Wi turata	Loo phi jewe
We go	Ei khói chule	Jáng thang doo	Kei ho kache	Anui táratá	Uko phi jewe
Ye go	Meng khói chule	Nurao thang dou [doo]	Nung ho nache	Nung nui tu- rata	Neko phi jewe
They go	Ma khói chule	Burao thang	Hi ho ache	Wi nui tarata	Lúko phi jéwe
I went	Ei chulú re	Ang thang ba	Kaché ta	Ita titá	A phi shéwe
I will go	Ei chukin í	Ang thang nung dou	Chéngé	I ta túta	A phi tówe
I go not	Ei chuloe	Ang thang ya	Kaché hi e	I tám rei	Aphi mo jewe
I did not go	Ei chut ri	Ang thang bágri	Kache ta hie	I tám i lei	Aphi mo shewe
I will not go	Ei chuloe	Ang thang ya	Che hí inge	I ta tá ta	Aphi mo towé
I wish to go	Ei chutnin ge	Ang thang ma majúng doo	Kache nome	I ta nei ta	Akaphi chowé
I can go	Ei chut pag num guni	Ang thang phoore	Kache theie	I ta dui	Akaphi tomú
I may go	Eichulogaphei	Ang thangete humbi	Kache aphae	I ta chei í [loulou]	Aphi le vi
Let us go	Ei chutba pío	Ango thang mari	Kei ei ché sain	Achupei tó [lao]	A bo phi che
Go thou	Nung chukro	Noo thang	Chétán	Nung tachó	No phi che
Do not go	Chu kuno	Da thang	Che hi in	Thusho	Phi he
Give me	Ei gñóuda pió	Ané ri	Kei ei péñ [in	Ahang pé lao	A chíú
Come here	Arídu láo	Era phai	Hikoma hung-	Aiga pei lao	Haki phir
Be silent	Tum i leio	Prooprodong	Pao po hén	Re re bum lao	Depú he
Take this away	Asi púkho	Ebo kho lang	Hin lán chójin	Mateta lao	Pe voche
Bring that here	A'si purwo	Houbó kho	Hu hin chójin	Wiche tepa lao	Loo phi phirte
Yes	Hoi	Añ [lábo	Héngé	E'oo	U'we
No	Nate	Niañ	...	E'h	Mówe
Why	Karigi tumuk	Sámuni	I díngá	Dai lou	Kéle
How	Kurum tauna	Bédehè	I to bung	Dai dou sha	Kidísí lega
How much	Kayá [ge	Bisi lai	Iját	Daijou	Kajé ki ga
How large	Kayá chouba	Bisi dére	I té línum	Dai gúm di lao	Kajá ki chúga
How high	Kayá wángé	Bisi júre	Ichun shán- gum	Dai gúm hoo lao [lao]	Kirke ki chúga
How deep	Kaya loobage	Bisi thí bi	Ichunthoo um	Dai gum choog	Kasú ki chúga
How far	Kaya Lábe [bage	Bisi chaim ba	Ichun ghum [lum	Dai gum teo lao [lao	Kacha kichuga [wa
How was it	Kurum don	Bide zákha	Ití hum	Dai dou sha	Kaje bochi be

<i>Old Kookie.</i>	<i>Meekir.</i>	<i>Remarks.</i>
Ishem	Angár	New and old K.
Nar khook	....	Man. new and old K.
Voi sun	Khipé	Cach and Meekir. New and old K.
Sé ek	Joi go bang	All except Cach. and Meekir.
Khoboor	Shoom jám	Man. and new K.
Rong in rook	Doi oi	Man. new and old K.
Hong koire	Jong héterám	Ditto.
Enro	Láng not	New and old K.
Vadong ro	Arjú non	Ditto.
Tong bút	Thák not	Man. Gna. Ar.
Lhung rei	Rák nón	Mon. new and old K.
Shúdro	Pri non	Ditto.
Numro	Ing ním non	
Kei kafe.	Nge dám lo	
Nung Nafé	Nung	
Khú afe	Nang	
Keimani kafe	Ngetum	
Nunmani nafe	Nungtúm	
Khú mani afe	Nang túm	
Kei kafe ták	Nge tá tún lo	
Kei fénke	Nge dam po	
Kei kafé mak	Nge dám te lo	
Kei kafetamak	Nge dám de láng	
Kei fenóning	Nge dám te lo	
Kei kafe nóm	Nge dám toong ong	
Kei kafe thei	Nge dám oon	
Kei kafén thág iti	Nged ám oonte mélo	
Kei lei fe sáro	Nge dám po ne pinot	
Nung fétero	Nung dam	
Nung fénoro	Dám ri [not	
Kei ni pero	Nge phán pí	
Hituk ahin	Dákle váug	
Húngro		
Tongno ro	Doyoira do	
Choin la féro	La po not	
Khóakha hung	Hala tava not	
Anuit laro	Hoi tema	Man. and Meekir Cach, and old K.
Ní muk	Kali	
Irhungimé	Kopi lo	
Inkunim	Kolo pú lung	
Ijáka	Ko láng do	
Itén kám alín	Kolo anthaima	
Iten kám ari-sáng [thook	Kolo angi ding	
Iten kám án-	Koló arnuk ma	
Iten kan alhut	Kolo ánhilo	
Imani 6	Pite pláng lo	

<i>English.</i>	<i>Manipoorie.</i>	<i>Cacharee.</i>	<i>New Kookie.</i>	<i>Aroong Naga.</i>	<i>Angami Naga.</i>
How are you	Kurum pali	Noo bide hé	Iti nahím	Dai gúm bam-dí she	No kidi bága
Thus	Asundowna	Ebo lai	Hítñ	Ai gúm	Hai kamá
Here	Ásida	Erá há	Hia-Hikóma	Aliá	Hucha
There	Asómda	Hou ra	Húa-Húkoma	Wímbé	Loocha
Where?	Kei da	Buráha	Hoya	Daina	Ki chagá
Now	Huchik	Dúha	Túa-Toon	Chúna	Tche
Then	Asai	Monung ha	Hú phat	Wi jó	Kunó
When	Horén	Duha	Ajou	Danaíne	Kechi ki toga
When?	Kadóng nai	Bakháli	Ití a	Dai doune	Vo to ga
To-day	Ashi	Dini	Too ni	Anaimai	Te jú
To-morrow	Aráng	Miáha	Jíng le	Jinai pache	U'n dú
Yesterday	Hai yeng	Duknáha	Jíng	Jinai	So dú
To	Da	Kó	A	A	Nú
From	Di gi	Ní	A	Se	Nula
By	Na	Jáng	In	Ne	Pe
With	Loi nít na	Loogoo	Henga	Choo	Bo
In	Da	Ha	A	Ga	Nú
On	Thuk	Ha	A	Rei ga	Nú
Within	Yimáng	Bising ha	Shoong	Bolúnga	Ki nú
Without	Mapál	Baji ha	Po	Mákse	Ki ta
Between	Moyaida	Juj hera	A lai	Malúngra	Pomá chenú
Above	Mathuk	Busao	Chúng	Peréga	Keri kégí
Below	Makha	Bukh la	Tol-Noya	Kunáwa	Ker nó noo
And	Súng	Ar	Chile	Chaine	Di
Also	Ama súlei	Bo	Yong	De	Ri
Or	....	Tí	Never used	....	....
Although	....	Sakung ha	Ma	Kureiba	Thuzúno
But	Adoga	Dabo	Chú in	Chaine	Sá
If	Bacil	Mánangha	Ma	Indamei	Nole
Unless	Badi [khai]	....	Ahiváng in	Indamei	....
Until	Adoo gi ma-	Da Nunga	Hú ti phat	Námei	Kamusa
Before	Mangda	Sa kung ha	Amusa	Rei lou	Lookí
Behind	Tungda	Ya hoong ha	Núnga	Na lou	Ussa
Aside	Nakul	Sakoi si	Apunga	Tunsuni	Loocha
Among	Moyai da	Besing ha	Kiká a	Bukuka	Machono

Notes.

Kh. and Gh. are not guttural in this language.

Kh. and Gh. are invariably guttural. Their other sounds being unused.

The final U has the sound of the French E. in this language.

<i>Old Kookie.</i>	<i>Meekir.</i>	<i>Remarks.</i>
Inkana úm- chem	Náng piti plang	
Hinkihin	Lapohi lo	New and old K.
Pe hin	Lagema	Ditto.
Hú a khoo	Hali	Cach. new and old K.
Ta kám	Koná holó	
Too	Non het lung	New and old K.
Atik	Chúnonda	
Anit le	Nonhe la	
Iti ghin im	Kumántoo	New and old K.
Atoo nim	Míni	Cach. new K. old K. and Meekir.
Took jíng	Pa tini	New K. Ar. and old K.
Von jíng	Minap	Man. new K. Ar. and old K.
A	a	New K. Ar. old K. and Meekir.
A	pén	New K. and old K.
In	pén	Man. and Ar. Gna. and Meekir new K. and old K.
Jénga	ri	New and old K.
A	e	Ditto.
A	a	Ditto and Meekir.
Shoong	Hémárlo	Man. new K. and old K.
Apooa	Angtán	New and old K.
A lai tuk	Angbong	Man. new and old K.
Chúnaga	Atháp	New and old K.
Atúl	Ahroom	Ditto.
Khun choo	Kúlapoo	
Khom	Yi	
....	
....	Aphprung	
....	Polo	
Ait nága	Móla	
....	
Hi tik tukin	Mónonphi	
Amása	Ako	New and old K. and Man.
Núng ita	Apái	Man. new and old K.
Ako la	Eplák	
Kinin kár	Arh lo	New and old K.

In the verbs, the addition of "Kitti" is required to each to form the imperative.

Abbreviations:

Man. Manipoorie. Gna. Angamie Naga.
 Cach. Cacháree. New K. Thadon Kookie. Mee. Meekir.
 Old K. Beteh Kookie. Hind. Hindustani.
 Ar. Aroung Naga.

II.

Abstract of Meteorological Observations taken at Apaloo in Northern Cachar, from the 18th June to October, 1855.

Maximum height of Thermometer from 18th to the end of June.

At 6 A. M. ..	..	..	..	78°
9 A. M. ..	..	..	..	81
Noon, ..	..	..	..	82
3 P. M. ..	..	..	..	82½
6 P. M. ..	..	..	..	82
9 P. M. ..	..	..	..	80

Average maximum,.. 80.875°

Average height of Thermometer from 18th to the end of June.

At 6 A. M. ..	..	..	..	74.61
9 A. M. ..	..	..	..	76.36
Noon, ..	..	..	..	77.69
3 P. M. ..	..	..	..	79.07
6 P. M. ..	..	..	..	77.52
9 P. M. ..	..	..	..	75.98

Total average,.. 76.8716°

Minimum height of Thermometer from 18th to end of June.

At 6 A. M. ..	..	..	..	72°
9 A. M. ..	..	..	..	73½
Noon, ..	..	..	..	74½
3 P. M. ..	..	..	..	76
6 P. M. ..	..	..	..	74
9 P. M. ..	..	..	..	72½

Average minimum,.. 73.75°

Register of rain fall, from 18th to the end of June, 1855.

No. of rainy days,..... 11

No. of fair days,..... 2

Total amount of rain, in inches, 5.275

Average per 24 hours, 0.4057

Average during rainy days, 0.47954

Maximum fall in 24 hours, 1.675

Maximum height of Thermometer during July, 1855.

At 6 A. M. ..	..	..	..	$78\frac{1}{2}^{\circ}$
9 A. M. ..	..	..	..	81
Noon, ..	..	..	..	$84\frac{1}{2}$
3 P. M. ..	..	..	..	$84\frac{3}{4}$
6 P. M. ..	..	..	..	$83\frac{3}{4}$
9 P. M. ..	..	..	..	80
Average maximum,..				82.083°

Average height of Thermometer during July, 1855.

At 6 A. M. ..	..	..	..	76.129
9 A. M. ..	..	..	..	78.371
Noon, ..	..	..	..	80.202
3 P. M. ..	..	..	..	80.774
6 P. M. ..	..	..	..	79.411
9 P. M. ..	..	..	..	77.137
Total average,..				78.6706°

Minimum height of Thermometer during July, 1855.

At 6 A. M. ..	..	..	..	73°
9 A. M. ..	..	..	..	74
Noon, ..	..	..	..	$75\frac{3}{4}$
3 P. M. ..	..	..	..	72
6 P. M. ..	..	..	..	$75\frac{1}{2}$
9 P. M. ..	..	..	..	74
Average minimum,..				74.0416°

Register of rain fall during July, 1855.

No. of rainy days,	23
No. of fair days,	8
Total amount of rain, in inches,	.. .. 7.150
Average per 24 hours, .. ..	.. .. 0.23064
Average during rainy days,	.. .. 0.31086
Maximum fall in 24 hours,	.. .. 1.725

Maximum height of Thermometer during August.

At 6 A. M. ..	..	..	..	78°
9 A. M. ..	..	..	..	80
Noon, ..	..	..	..	84 $\frac{1}{4}$
3 P. M. ..	..	..	..	85
6 P. M. ..	..	..	..	82 $\frac{1}{2}$
9 P. M. ..	..	..	..	79 $\frac{3}{4}$

Average maximum, 81.583°

Average height of Thermometer during August.

At 6 A. M. ..	..	..	..	74.766
9 A. M. ..	..	..	..	76.084
Noon, ..	..	..	..	78.298
3 P. M. ..	..	..	..	78.847
6 P. M. ..	..	..	..	77.411
9 P. M. ..	..	..	..	76

Total average,.. 76.901°

Minimum height of Thermometer during August.

At 6 A. M. ..	..	..	..	72°
9 A. M. ..	..	..	..	73
Noon, ..	..	..	..	73 $\frac{1}{2}$
3 P. M. ..	..	..	..	73 $\frac{1}{2}$
6 P. M. ..	..	..	..	73 $\frac{1}{4}$
9 P. M. ..	..	..	..	72

Average minimum,.. 72.875°

Register of rain fall during August, 1855.

No. of rainy days,.....	..	25
No. of fair days, .....	..	6
Total amount of rain, in inches,	..	14.050
Average per 24 hours, ..	..	0.453266
Average during rainy days,	..	.56
Maximum fall in 24 hours,	..	2.5

Maximum height of Thermometer during September.

At 6 A. M. ..	..	..	..	77°
9 A. M. ..	..	..	..	78½
Noon, ..	..	..	..	81½
3 P. M. ..	..	..	..	82
6 P. M. ..	..	..	..	80¾
9 P. M. ..	..	..	..	78

Average maximum,.. 79.625°

Average height of Thermometer during September.

At 6. A. M. ..	..	..	..	73.691°
9 A. M. ..	..	..	..	75.891
Noon, ..	..	..	..	78.033
3 P. M. ..	..	..	..	78.741
6 P. M. ..	..	..	..	77.258
9 P. M. ..	..	..	..	75.041

Total average,.. 76.4425°

Minimum height of Thermometer during September.

At 6 A. M. ..	..	..	..	70¾°
9 A. M. ..	..	..	..	72
Noon, ..	..	..	..	72½
3 P. M. ..	..	..	..	72
6 P. M. ..	..	..	..	72
9 P. M. ..	..	..	..	72½

Average minimum, . 72°

Register of rain fall during September, 1855.

No. of rainy days,.....	.....	16
No. of fair days,.....	.....	14
Total amount of rain, in inches,	..	.. 6.875
Average per 24 hours, ..	..	.. 0.22916
Average during rainy days,	..	.. 0.42968
Maximum in 24 hours, ..	..	.. 0.975

Maximum height of Thermometer from 1st to 10th October.

At 6 A. M. ..	..	..	..	$73\frac{1}{4}^{\circ}$
9 A. M. ..	..	..	..	$74\frac{1}{2}$
Noon, ..	..	..	..	$77\frac{3}{4}$
3 P. M. ..	..	..	..	$78\frac{3}{4}$
6 P. M. ..	..	..	..	78
9 P. M. ..	..	..	..	76
Average maximum, ..				76.375°

Average height of Thermometer from 1st to 10th October.

At 6 A. M. ..	..	..	..	71.425°
9 A. M. ..	..	..	..	72.85
Noon, ..	..	..	..	74.85
3 P. M. ..	..	..	..	75.45
6 P. M. ..	..	..	..	75.
9 P. M. ..	..	..	..	72.8
Total average, ..				74.7425°

Minimum height of Thermometer from 1st to 10th October.

At 6 A. M. ..	..	..	..	$68\frac{1}{4}^{\circ}$
9 A. M. ..	..	..	..	$68\frac{3}{4}$
Noon, ..	..	..	..	69
3 P. M. ..	..	..	..	$69\frac{1}{4}$
6 P. M. ..	..	..	..	$71\frac{3}{4}$
9 P. M. ..	..	..	..	$70\frac{1}{4}$
Average minimum, ..				69.5416°

Register of rain fall from 1st to 10th October, 1855.

No. of rainy days,	5
No. of fair days,	5
Total amount of rain, in inches,	.. .. 4.9
Average per 24 hours, ..	.. .. 0.49
Average during rainy days,	.. .. 0.98
Maximum fall in 24 hours,	.. .. 1.8

Maximum average of Thermometer from 18th June to 10th Oct.

	1855.
During June,..	.. .. .. 80.875°
July,..	.. .. .. 82.083
August,..	.. .. .. 81.583
September,..	.. .. .. 79.625
October,..	.. .. .. 76.375
Maximum average, .	$80^{\circ} 1082'$

Total average of Thermometer from 18th June to 10th October,

	1855.
During June,..	.. .. .. 76.8716°
July,..	.. .. .. 78.6706
August,..	.. .. .. 76.901
September,..	.. .. .. 76.4425
October,..	.. .. .. 74.7425
Total average	76.72565°

Minimum average of Thermometer from 18th June to 10th Oct.

During June, .	.. .. .. 73.75°
July,..	.. .. .. 74.0416
August,..	.. .. .. 72.875
September,..	.. .. .. 72.
October,..	.. .. .. 69.5416
Minimum average,..	72.44165°

Register of rain fall from 18th June to 10th October.

No. of rainy days,.....	80
No. of fair days,.....	35
Total amount of rain, in inches,	.. .. 38.25
Average per 24 hours, ..	.. .. 0.315217
Average during rainy days, ..	.. .. 0.478124
Maximum fall in 24 hours, ..	.. .. 2.5
Average maximum fall in 24 hours, ..	.. .. 1.735

Notes on the foregoing Observations.

The instruments, by means of which these observations were taken, being very imperfect ones, it is necessary to give some account of them, in order to show how far the Register may be relied upon.

The *Thermometer* used, was a small one made by R. Field and Son, rising to beyond boiling point of water and graduated to two degrees only. Experience in reading however, easily enabled any one to ascertain the height to a quarter of a degree.

The Thermometer was hung on the eastern wall of an eastern room, sixteen feet square, in a mat house. The wall consisted of a double set of coarse bamboo mats, six inches apart, the interstice being left vacant. The Thermometer did not touch the wall, but stood three inches out.

The room had two small windows facing the east, one of which was left open night and day; on the north and south were doors leading into verandahs, and on the west to other rooms. No fire was ever lighted in the room.

The *Pluviometer* consisted merely of a hollow tin cylinder, two and a half feet long, and four and a half inches in diameter.

This was placed in a wooden frame, on a level piece of ground, beyond the influence of houses or trees, at right angles to the earth. The contents were measured every morning at 9 A. M. by means of a foot rule graduated to twentieths of an inch, the depth of water being easily ascertainable to the fortieth of an inch. The mean of seven measurements was taken to establish each day's fall.

Once a week the Pluviometer was tested, to prove that it remained water-tight, this was done by filling it with water and enveloping it in a sheet of blotting paper—a slight saturation of the paper, after an hour's trial, on one occasion, showed that a leak existed, but it was immediately repaired.

No calculation has been made in this register for the evaporation of water from the instrument, and considerable quantities must have so disappeared, as rain has generally fallen in slight showers, succeeded by hot sunshine.

The present season is considered a remarkably dry one as far as it has gone, but the drought has not affected either the spontaneous

vegetation or the cultivation in the district, both of which are luxuriant; I cannot, therefore, think that there has been any great deficiency in moisture.

Apaloo is situated on the spur of a hill on the northern face of an extensive range of mountains, called the Burrail, running east and west between the rivers Brahmaputra and Soorma. Three attempts at approximating to the height, by ascertaining the boiling point of water, give the following results:—

1st Temp. of air 80°. Boiling point 209°. Height 1687 feet.

2nd ditto 84 ditto 208 $\frac{3}{4}$ ditto 1836 ditto.

3rd ditto 77 ditto 209 $\frac{1}{4}$ ditto 1537 ditto.

the mean of which is 1686 feet.

The spur, on which the station is built, runs down from a large hill towering some thousand feet immediately above the place to the S. E. On the S. W. rises a large mountain some 5000 feet in height, and distant only about three or four miles from Apaloo. Between these two mountains, and (to within a degree) directly south of the station lies a gorge, or valley, the crown or head of which is 2376 feet above the level of the sea, and through which, the prevailing wind precipitates itself on the station. The direction of the wind, however, from the local circumstance of the ridge above Apaloo presenting itself as a barrier, is not as might be supposed due south, but almost exactly S. E., the superior ridge having the effect of turning the current in an easterly direction.

Due east there is another gorge between the Apaloo mountain, and the one adjacent to it on the north; through this however, the winds are infrequent. The site of Apaloo overlooks the northern and western sides, the winds from those directions are therefore not acted upon by any local agency.

In this register, I have given *seven* places of force to the wind, and as I had no other means of determining these, otherwise than by the resistance of my own person, and neighbouring objects, I preferred naming them by terms significant in themselves, rather than by employing numbers, which would require experience to be properly appreciated.

The seven places are as follows—

- | | |
|-------|-----------------|
| Calm. | 1. Very slight. |
| | 2. Slight. |
| | 3. Stiff. |
| | 4. Hard. |
| | 5. Very hard. |
| | 6. Stormy. |
| | 7. Hurricane. |

The first ranges from the slightest motion in the air, to about that degree of force required to raise a flag to about an angle of 45° with the staff.

The second continues from that, until the flag flies parallel to the earth.

The wind is "stiff," when it offers material resistance to proceeding against it. "Hard" when the trees bend and groan under it. "Very hard" when green leaves are stripped off the trees, and all light articles on the ground are whirled up in the air. "Stormy" when branches are torn from the trees, and these themselves, when with no depth of root, prostrated. And a "hurricane" there can be no mistaking.

In observing the clouds, I have only written down the predominating form of cloud visible at the time.

When "nimbus" is recorded, it was positively raining at the time of observation.

R. STEWART.

Apaloo, N. Cachar, 11th October, 1855.

III.

Measurements of some of the tribes Inhabiting the hills on the Eastern frontier of Bengal.

NOTE.

The following measurements of the tribes were commenced with an idea, that they might be useful in determining the affinity of the various clans. Independently however of its being a laborious and unpleasant occupation, the work was arrested by an opinion having got abroad among the people that such close research was connected with an unholy purpose, and nothing could dissuade them from this absurd belief.—One or two of those last measured, being covered to undergo the operation, evinced the greatest trepidation during the process, and not even the bribe of 4 annas per man, offered to likely subjects, could induce them to come forward, they avering that they would be obliged to spend four times that sum, afterwards, in sacrifices, to avert the evil that might accrue to them—with the single exception of the old Kookie, however, in these measurements, the others are very fair average types of their respective tribes.—The former is a very small specimen, and but poorly represents his family.

R. STEWART.

Tables showing the measurements of the bodies, and limbs of average sized
stating their supposed ages and noting any

Shíngshón, New Kookie village.		Thadon. village Jampi.		New Kookie village.		Thadon. New Kookie village.		Shénghow male.		Tribe and Residence.		
Kóbhé Tung male.	Shóngtung male.	Shíngshón, village Jampi.	Thadon.	New Kookie village.	Thadon.	New Kookie village.	Shénghow male.	Name and Sex.	Supposed Age.	Entire Height.	Measurements of Length.	Measurements of
22	5	38	5	0	17½	17	28¾	25	5	19½	Hip joint to knee.	Measurements of Length.
										18	Knee to sole.	Legs.
										29¼	Fork to sole.	Legs.
										14	Shoulder to elbow.	Arms.
										17	Elbow to tip of middle finger.	Arms.
										21¼	Horizontally round the forehead.	Head.
										21	Round forehead and ears.	Head.
										13	Necks.	Body.
										12½	Shoulders.	Body.
										40	Chest.	Body.
										37½	Waist.	Body.
										30½	Hips.	Body.
										28		
										26		
										34		
										33		
										32½		

men of the different tribes inhabiting the Eastern Frontier of Bengal, marked peculiarity of person or features.

Girth.						Face.		Foot.		Remarks.
Legs.	Arms.	Upper arm.	Lower arm.	Wrist.	Length.	Breadth.	Length.	Breadth.		
18 $\frac{1}{2}$	13 $\frac{1}{2}$	9 $\frac{1}{4}$	9	5 $\frac{1}{2}$	7 $\frac{3}{4}$	6	9 $\frac{1}{2}$	3 $\frac{1}{2}$		Complexion fair. Hair black and long. Forehead high and broad, but retreating very much. Eyebrows scanty. Eyes dark, small, almond-shaped, and not sunk in sockets. Nose long and prominent, nostrils small. Cheek-bones high, broad and prominent. Mouth small. Lips large and protruding. Teeth complete, slightly irregular and covered with tartar. A few hairs on upper lip and chin. Chin round and retreating. Ears small-bored large enough to admit a pencil. Face egg-shaped.
18	13 $\frac{3}{4}$	9	8 $\frac{1}{4}$	6	8 $\frac{1}{2}$	5 $\frac{3}{4}$	9 $\frac{3}{4}$	3 $\frac{1}{2}$		Complexion dark. Hair black, fine, long and scanty. Forehead round. Eyebrows well marked. Eyes dark, small, almond-shaped, and not sunk deep in sockets. Nose and nostrils large, but not flat. Cheek-bones not prominent. Mouth large, upper lip long and compressed, under lip large and protruding. Teeth complete, irregular and dirty. No hair on face. Chin round, ears large, with bore sufficient to admit a pencil. Face egg-shaped.
18 $\frac{1}{2}$	13	8 $\frac{1}{2}$	8 $\frac{1}{2}$	5 $\frac{3}{4}$	8	5 $\frac{1}{4}$	9 $\frac{3}{4}$	4		Complexion fair. Hair dark and long. Forehead high and broad, but retreating. Eyebrows well marked. Eyes small, black, almond-shaped and not retreating. Nose large, flat and broad. Nostrils wide. Cheek-bones high, broad and prominent. Mouth large. Lips large, red, and protruding. Teeth regular, complete and covered with tartar. No hair on face. Chin large and square. Ears *and

Measurements of Length.										Measurements of						
Entire Height.		Legs.			Arms.			Head.		Body.						
		Feet.	Inches.					Fork to sole.	Shoulder to elbow.	Elbow to tip of middle finger.	Horizontally round forehead.	Neck.	Shoulders.	Chest.	Waist.	Hips.
hángsén. New Kookie village.		Shíngshón. New Kookie village Jampi.		Shíngshón. New Kookie village.												
Loonjapou male.		Kimja male.		Name and Sex.												
35	5	5	1 $\frac{1}{2}$	30	5	19	17 $\frac{3}{4}$	28 $\frac{1}{2}$	13	18 $\frac{1}{4}$	21 $\frac{1}{4}$	12 $\frac{3}{4}$	40 $\frac{1}{2}$	32	33 $\frac{1}{4}$	
	3	3	20	23	5	18	28 $\frac{3}{4}$	13 $\frac{1}{4}$	17 $\frac{1}{2}$	22 $\frac{1}{4}$	22	12 $\frac{1}{2}$	39 $\frac{1}{2}$	31 $\frac{1}{4}$	25 $\frac{3}{4}$	
	16 $\frac{1}{2}$	17 $\frac{3}{4}$	28					21 $\frac{1}{2}$	20 $\frac{3}{4}$	13	40	33 $\frac{1}{2}$	28 $\frac{1}{2}$	33 $\frac{1}{2}$		

Girth.					Face.		Foot.		Remarks.
Legs.		Arms.							
Thigh.	Calf.	Upper arm.	Lower arm.	Wrist.	Length.	Breadth.	Length.	Breadth.	
20	13 $\frac{3}{4}$	10 $\frac{1}{4}$	9	6	7 $\frac{3}{4}$	6	10	3 $\frac{1}{2}$	Complexion dark. Hair black, long, and rather fine. Forehead straight, narrow and low. Eyebrows irregular and scanty. Eyes black and almond-shaped. Nose small, but broad and flat. Cheek-bones very prominent, broad and high. Mouth small, lips small, but protruding. Teeth complete, slightly irregular and very dirty. A few black bristles on upper lip and chin. Chin small, round and retreating. Ears small, bored with a hole large enough to admit forefinger. Face almost diamond-shaped.
18	12 $\frac{1}{4}$	8 $\frac{3}{4}$	8 $\frac{1}{4}$	5 $\frac{1}{4}$	7 $\frac{1}{2}$	6	9	3 $\frac{3}{4}$	Complexion rather dark. Hair black, long and fine. Forehead high and round. Eyebrows well marked and shaggy. Eyes large, almond-shaped and dark. Nose small, but broad, and nostrils wide. Cheek-bones high, and very broad. The entire face, by reason of them, being nearly as broad as long. Mouth small, lips small and well shaped. Teeth complete and regular, slightly covered with tartar. No hair on face. Chin pointed. Ears small, and very slightly bored. Face almost round with the exception of the angular chin. Head altogether large for the body.
18 $\frac{3}{4}$	13 $\frac{1}{4}$	10	10	6	8 $\frac{1}{4}$	5 $\frac{1}{2}$	10	4 $\frac{1}{4}$	Complexion fair. Hair black and long. Eyebrows scanty. Forehead high and broad, but retreating very much. Eyes small, almond-shaped, dark, and not sunken but almost on the surface of the face. Nose long and prominent. Nostrils small. Cheek-bones high, broad and prominent. Mouth small, lips large and protruding. Teeth complete slightly irregular and dirty. A few hairs on upper lip and chin. Chin round and retreating. Ears naturally large and made more so by

Meekir, age Lângpher.		Lhungmû New Kookie, village Thaipundisa.		Tribe and Residence. Khoopion male.		Measurements of Length.												Measurements of							
Meekir, age Lângpher.		Lhungmû New Kookie, village Thaipundisa.		Tribe and Residence. Khoopion male.		Entire Height.		Legs.		Arms.		Head.		Body.											
Meekir, age Lângpher.		Lhungmû New Kookie, village Thaipundisa.		Tribe and Residence. Khoopion male.		37	29	5	Feet.	19	From hip to knee.	13	Shoulder to elbow.	22½	Horizontally round forehead.	12½	Neck.	40	Shoulders.	32½	Chest.	27½	Waist.	32½	Hips.
38	5	5½	21	18½	32	12½	19	18½	Inches.	30½	Knee to sole.	13	Fork to sole.	21½	Elbow to tip of middle finger.	21½	Round forehead and ears.	40½	Shoulders.	32½	Chest.	27½	Waist.	32½	Hips.

Girth.					Face.		Foot.		Remarks.
Legs.		Arms.			Length.	Breadth.	Length.	Breadth.	
Thigh.	Calf.	Upper arm.	Lower arm.	Waist.					
18	13 $\frac{1}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	5 $\frac{1}{4}$	8	5 $\frac{3}{4}$	9 $\frac{1}{2}$	3 $\frac{1}{2}$	Complexion dark. Hair black. Forehead retreating. Eyebrows scanty. Eye dark, being blind of the other from small-pox and not sunk far into the head. Nose large and broad. Nostrils wide. Cheek-bones high but narrow. Mouth large. Lips protruding but small. A few bristles on upper lip and chin. Chin retreating. Ears large and bored $\frac{1}{2}$ inch in diameter. Face pear-shaped.
18 $\frac{1}{4}$	13 $\frac{1}{2}$	9 $\frac{1}{2}$	9	5 $\frac{3}{4}$	7 $\frac{3}{4}$	5 $\frac{1}{2}$	10 $\frac{1}{4}$	4	Complexion dark. Hair shaved with the exception of a tuft on scalp, black and coarse. Forehead narrow and retreating. Eyebrows shaggy. Eyes large, almond-shaped, and dark. Nose snubbed, very large and broad. Nostrils very wide. Cheek-bones high. Mouth very large. Lips very broad. Teeth black, regular and complete. A black moustache with long hair, though scanty, no hair on cheek or chin. Chin large and retreating. A swelling on the left side of neck (cause unknown) about the size of a large marble. Ears small and slightly bored. Face square.
17	12 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	5 $\frac{1}{2}$	7 $\frac{1}{2}$	5	10 $\frac{3}{4}$	3 $\frac{1}{4}$	Complexion fair. Hair shaved, with the exception of a tuft on scalp, black and coarse. Forehead narrow, low and retreating. Eyebrows scanty. Eyes large, dark, almond-shaped. Nose long. Nostrils large. Cheek-bones high but not broad. Teeth black, irregular and incomplete. Moustache short black, hair very scanty. No whiskers or beard. Chin large and square. Ears

Measurements of Length.										Measurements of						
Entire Height.		Legs.			Arms.			Head.		Body.						
		Feet.	Inches.	Hip to knee.	Knee to sole.	Fork to sole.	Shoulder to elbow.	Elbow to tip of middle finger.	Horizontally round forehead.	Round forehead and ears.	Neck.	Shoulders.	Chest.	Waist.	Hips.	
Beteen Old Kooie, village Bélmöl.	Meekir, Thaipún disa.															
Haichóngmún male.	Sarkro. male.	Sármoo male.														
20	5	0 ³ ₄	18	16	29	12	17	22	21 ¹ ₂	20 ¹ ₂	20	11 ³ ₄	39	33 ¹ ₄	26	
25	5	8 ¹ ₂	21	19 ¹ ₄	32 ³ ₄	13	17 ¹ ₂	21 ¹ ₄	21 ¹ ₂	20 ¹ ₂	11 ³ ₄	36 ¹ ₂	29 ¹ ₂	23 ³ ₄	31	
27	5	4 ¹ ₄	19 ¹ ₂	18 ¹ ₂	29 ³ ₄	14	18 ¹ ₄	20 ¹ ₂	20 ¹ ₂	20	11 ³ ₄	39	32 ¹ ₂	25	33	
20	5	0 ³ ₄	18	16	29	12	17	22	21 ¹ ₂	21 ¹ ₂	21 ¹ ₂	11 ¹ ₂	43	33 ¹ ₄	26	33

Girth.						Face.		Foot.		Remarks.
Legs.		Arms.				Length.	Breadth.	Length.	Breadth.	
Thigh.	Calf.	Upper arm.	Lower arm.	Wrist.						
17	12 $\frac{1}{2}$	8	8	5 $\frac{1}{2}$	6 $\frac{1}{2}$	5	10 $\frac{1}{2}$	3 $\frac{1}{4}$		Complexion fair. Hair shaved in front and at sides, black, long and coarse in the centre of the head. Forehead very low indeed, narrow, and perpendicular. Eyebrows scanty. Eyes large, round, dark. Nose large. Nostrils small. Cheek-bones high and prominent. Mouth large, lips protruding. Teeth regular, complete and dirty. No hair on face. Chin round. Ear large, and bored large enough to admit little finger.
17	13	9 $\frac{1}{4}$	8 $\frac{3}{4}$	5 $\frac{1}{2}$	7	5	10	3 $\frac{1}{2}$		Complexion fair. Hair shaved all round the head, leaving a large tuft in centre—coarse and black. Forehead low, narrow, round. Eyebrows scanty and shaggy. Eyes dark, small, almond-shaped. Nose short and broad. Nostrils wide. Cheek-bones high and narrow. Mouth large, lips small. Teeth black, regular, complete. Chin long, square. A few hairs as moustache. Ears slightly bored, face square.
18	13	9 $\frac{1}{4}$	8 $\frac{1}{2}$	5 $\frac{1}{2}$	7 $\frac{1}{2}$	5 $\frac{1}{2}$	9	3 $\frac{1}{2}$		Complexion dark. Hair black, coarse, cut short and erect in front. Eyes full-sized, dark, almond-shaped and not sunk much into the head. Eyebrows well marked. Forehead low and retreating. Nose small and flat. Cheek-bones very broad and prominent though not high. Mouth small, upper lip protruding, though small. Under lip broad. Teeth complete, regular and slightly covered with tartar. No hair on face. Chin small and square.

Girth.						Face.	Foot.	Remarks.		
Legs.		Arms.								
Thigh.	Calf.	Upper arm.	Lower arm.	Wrist.		Length.	Breadth.	Length.	Breadth.	
18 $\frac{1}{2}$	13 $\frac{1}{4}$	9 $\frac{1}{4}$	8 $\frac{3}{4}$	5 $\frac{1}{2}$		7 $\frac{1}{2}$	5 $\frac{1}{4}$	9	3 $\frac{1}{4}$	Complexion dark. Hair black, coarse, short. Forehead high, narrow, and retreating. Eyebrows faintly marked. Eyes almond-shaped, dark, and prominent. Nose well-shaped. Cheek bones high and broad, mouth large, lips prominent, teeth irregular, clear and complete. No hair on cheek, chin or lips. Chin round. Ears small, and bored with three small holes in each. Face triangular. A mole on right cheek.
19 $\frac{3}{4}$	14 $\frac{1}{4}$	10 $\frac{1}{4}$	9 $\frac{1}{4}$	5 $\frac{3}{4}$		7	5 $\frac{1}{2}$	9 $\frac{1}{4}$	3 $\frac{1}{2}$	Complexion fair. Hair black, long, and coarse. Forehead low, narrow, straight, and wrinkled. Eyebrows thick and shaggy, slanting upwards from the bridge. Eyes dark, round, and prominent, with the outward corners turned up. Nose broad and prominent, ending in a round nob. Cheek bones very broad. Mouth small, lips small, teeth white, complete and irregular. No hair on face. Chin round. Ears small, bored with 3 holes in each. Face square. Shoulders slanting.
20 $\frac{1}{2}$	15 $\frac{1}{2}$	10 $\frac{3}{4}$	9 $\frac{3}{4}$	6 $\frac{1}{4}$		7 $\frac{1}{4}$	6	10 $\frac{1}{2}$	3 $\frac{1}{2}$	Complexion dark. Hair black, coarse, short. Forehead broad, low, straight. Eyebrows scanty. Eyes dark. Nose broad. Nostrils wide. Cheek bones very broad and prominent. Mouth large, lips large and broad. Chin large and round. A few hairs on lips and chin. Ears large, the lower lobe joined on to the cheek, and bored with three small holes. Face very broad and square.

Measurements of Length.												Measurements of				
Tribe and Residence.																
Aroong Naga, village Apilo.		Aroong Naga, village Gurriio.		Tonlé Kumba, male.		Name and Sex.		Entire Height.		Legs.		Arms.		Head.		
Supposed Age.		Feet.	Inches.	Hip to knee.		Knee to sole.		Shoulder to elbow.		Fork to sole.		Elbow to tip of middle finger.		Horizontally round forehead.		Neck.
23	5	4	19	18 $\frac{1}{2}$		18 $\frac{1}{2}$		13 $\frac{1}{4}$		18		21 $\frac{1}{2}$		21		12
19	5	2 $\frac{1}{2}$	18 $\frac{1}{2}$	18		29		12 $\frac{1}{2}$		17		21 $\frac{1}{2}$		20 $\frac{3}{4}$		38
24	5	2 $\frac{3}{4}$	19 $\frac{1}{2}$	18 $\frac{3}{4}$		31		12		17		21		20		31
																38
																31
																24 $\frac{3}{4}$
																30 $\frac{1}{2}$
																24 $\frac{1}{2}$
																29 $\frac{1}{2}$

Girth.					Face.		Foot.		Remarks.
Leg.	Arms.				Length.	Breadth.	Length.	Breadth.	
Thigh.	Calf.	Upper arm.	Lower arm.	Wrist.					
15 $\frac{1}{2}$	12 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{3}{4}$	5 $\frac{3}{4}$	8	5	9 $\frac{1}{4}$	3 $\frac{1}{2}$	Complexion fair. Hair black, cut short, and erect in front. Eyebrows well marked. Forehead narrow and low, but not retreating. Eyes small, dark, almond-shaped, and not sunk far into the head. Nose small and well-shaped. Cheek-bones narrow, high, but not prominent. Mouth small, upper lip long, both prominent but not large. Teeth regular, complete and clean. No hair on face. Chin round and retreating. Ears large and bored large enough to admit a pencil. Face oval, large protuberance at navel.
17 $\frac{1}{2}$	12 $\frac{1}{2}$	8	9	6	8	5	10 $\frac{1}{4}$	5 $\frac{1}{2}$	Complexion fair. Hair black, coarse, short and erect in front. Forehead low, broad and round. Eyebrows well marked. Eyes large, almond-shaped and almost on the surface of the countenance. Nose flat. Cheek-bones narrow but high. Mouth small. Lips protruding. Teeth complete, irregular and dirty. No hair in the way of beard, whiskers, or moustaches. Chin round and retreating. Ears small, bored, large enough to admit a pencil. Face egg-shaped. Large hands and feet, and stooping shoulders.
17	11 $\frac{1}{2}$	8 $\frac{1}{4}$	8 $\frac{3}{4}$	5 $\frac{1}{4}$	7	5 $\frac{1}{2}$	9 $\frac{1}{2}$	3 $\frac{1}{2}$	Complexion fair. Hair black and short. Forehead high and perpendicular, but narrow. Eyebrows faintly marked. Eyes small, dark, almond-shaped, with the outward corners very much turned up and not sunk far into the head. Nose small, but broad and flat, nostrils wide. Cheek-bones high. Mouth large. Lips broad and protruding. Teeth complete, regular and of a yellow colour throughout. No hair on face. Chin square. Ears small and bored, large enough to admit a pencil. Face pear-shaped.

Girth.		Legs.				Arms.		Face.		Foot.		Remarks.
Thigh.	Calf.	Upper arm.	Lower arm.	Wrist.		Length.	Breadth.	Length.	Breadth.			
18	13 $\frac{1}{4}$	9 $\frac{3}{8}$	9 $\frac{1}{2}$	6	7 $\frac{1}{2}$	5 $\frac{1}{4}$	9 $\frac{1}{2}$	3 $\frac{1}{2}$				Complexion fair. Hair black, stiff, coarse, cut short and erect in front. Forehead high, broad, and perpendicular. Eyebrows scanty. Eyes black, almond-shaped and turned up at the outward corners. Nose small but flat. Cheek-bones high but not broad. Mouth large. Lips broad. Teeth clean, complete, but irregular. No beard or moustache. Chin large and square. Ears small and bored, large enough to admit a pencil. Face oval.
17	13 $\frac{1}{2}$	8 $\frac{1}{4}$	9 $\frac{1}{2}$	5 $\frac{3}{4}$	7	5 $\frac{1}{2}$	9 $\frac{1}{2}$	3 $\frac{1}{2}$				Complexion fair. Hair black, stiff, coarse, cut short and erect in front. Forehead low, narrow, but perpendicular. Eyebrows well marked. Eyes small, almond-shaped, and almost on the surface of the countenance. Nose large and broad, but not flat. Nostrils wide. Cheek-bones large and high. Mouth small, lips small but protruding. Teeth clean, complete, but slightly irregular. An incipient moustache, but no whiskers or beard. Chin square. Ears small and bored, large enough to admit a pencil. Face pear-shaped.
19 $\frac{3}{4}$	13 $\frac{1}{4}$	10 $\frac{3}{4}$	10	6 $\frac{1}{4}$	8	5	9 $\frac{1}{2}$	3 $\frac{1}{2}$				Complexion fair. Hair black, long, fine, and inclined to curl. Forehead high, narrow, and retreating. Eyebrows well marked, arched and sloping up outwards. Eyes large, dark and almond-shaped. Nose large, nostrils wide. Cheek-bones high and prominent. Mouth large, lips very broad and large. Teeth complete, regular and dirty. Long brown moustache, but no whiskers or beard. Chin round. Ear small and bored, with a small hole. Face very long, shaped oblong. Body covered with a few scanty hairs.
												N. B.—Beyond the moustache the Manipoories have little or no hair on the face in 9 cases out of 10.

Girth.				Face.		Foot.		Remarks.
Legs.		Arms.		Length.	Breadth.	Length.	Breadth.	
Thigh.	Calf.	Upper arm.	Lower arm.	Wrist.				
19 $\frac{1}{2}$	13 $\frac{1}{4}$	9 $\frac{1}{4}$	9	5 $\frac{3}{4}$	7	5	9 $\frac{3}{4}$	3 $\frac{1}{2}$

Complexion dark. Hair black, coarse, coming down to a peak on the forehead naturally, shaven in front, but long behind. Forehead narrow, low and retreating, slightly wrinkled. Eyebrows very prominent, abundant and shaggy, almost meeting over bridge. Eyes large and dark, the whiter being almost yellow. Nose large, nostrils wide. Cheeks sunken, bones being high and prominent. Mouth and lips large. Teeth irregular, complete and yellow. Thick hair about an inch in length, growing plentifully on cheek, chin and lips of black colour, but sprinkled with a few grey, as is also the hair of the head. Chin round. Ears large and bored, large enough to admit forefinger. Face long and oval.

N. B.—The Cacharies generally are without hair on the face.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR OCTOBER, 1855.

At a monthly general meeting of the Society held on the 3rd inst. at the usual hour.

BÁBU RÁMGOPÁL GHÓSE, Vice-President in the chair.

The minutes of the last month's proceedings were read and confirmed.

Presentations were received—

1. From J. Peel, Esq. Acting Principal of the Grant Medical College. A copy of the report of the College for the session 1854-5.
2. From N. Shaw, Esq. Secretary to the Royal Geographical Society of London. The 24th volume of the Society's Journal.
3. From Mons. C. Holst, Secretary to the University of Christiania. The latest publications of the University.
4. From L. Ingels, Esq. Two pairs of hempenshoes obtained at the village of Dungshani in the Kulu Range, and a specimen of iron ore from the Kotkae mines, Himalaya.

The following gentlemen were named for ballot at the next meeting.

J. P. Legeyt, Esq. proposed by Mr. Allen and seconded by the chairman.

J. Middleton, Esq. (for re-election) proposed by Mr. Allen and seconded by Mr. Bayley.

The chairman read to the meeting the following letter from Mr. Grote.

SIR,—I have the honor to acknowledge your letter of the 12th inst. giving cover to a resolution adopted by the Asiatic Society at their last ordinary general meeting, and recommending it to my earnest consideration.

The purport of the resolution is a gratifying proof to me of my not having laboured in vain in the honorable office to which the Society elected me now nearly three years ago, and under other circumstances I could scarcely hesitate to comply with an invitation at once so cordial and so flattering.

But the step which I have taken was a deliberate one, to which, with the greatest deference to the wishes of the Society, I must beg its permission to adhere.

I have, &c.

Calcutta, Sept. 15th, 1855.

(Signed) A. GROTE.

He then proposed that "this meeting receives with regret the resignation of Mr. Grote as Secretary of the Society and Editor of the Journal, and desires to record its grateful sense of the distinguished zeal and ability with which he has so long discharged the arduous duties of his office."

The motion having been seconded by Capt. Thuillier, was carried.

Communications were received—

1. From the Government of the N. W. Provinces through Mr. Assistant Secretary Carmichael, the Meteorological Register kept at the Government Secretariat, Agra, for the month of August last.

2. From E. Blyth, Esq. enclosing a paper entitled "Further Remarks on the different species of Orang-utan."

3. From E. Thomas, Esq. forwarding a paper on ancient Indian numerals.

4. From B. H. Hodgson, Esq. submitting a paper on a new Perdicine bird from Tibet, with a drawing.

5. From Major A. Phayre, transmitting, from Amerapura, a transcript and translation of a Burmese scroll found in the relic chamber of a Pagoda at Prome. "The writing of the scroll," says Major Phayre "is quite modern; but is still interesting as showing a Buddhist Monk's objects and wishes in restoring an ancient Pagoda."

He also announces the discovery of an ancient city near Pagan, several inscriptions from which he intends to send to the Society.

The Curators and the Librarian having submitted their monthly reports, the meeting adjourned.

Confirmed Nov. 7th, 1855.

J. W. COLVILE.

Report of the Curator Museum of Economic Geology.

Geology and Mineralogy : Silt of the Hooghly.—I have completed a long and careful examination of the average quantity and nature of the silt of the Hooghly and of the solid matter held in solution in the water. I have myself during twelve months taken water at the surface and at a mean depth, and I have also a set of bottles of water taken at a depth of three fathoms at the *Gasper Light Vessel*, through the kindness of Mr. T. S. Parker, her Chief Officer, which give some singular comparative results. I have moreover a set from the Rangoon and Moulmein rivers, which will form the subject of another communication.

Kunkur from Kedgeree.—Mr. Bensley of the H. C. Pilot service has obliged me with a fine specimen of the kunkur forming on the beach at Kedgeree, which is singularly interesting in a geological point of view, for while the waters of the river there contain both muriates and sulphates of lime and muriates of magnesia, the kunkur is simply a coarse grained ferruginous sandstone ; the cement being oxide of iron only.

ECONOMIC GEOLOGY.

Artificial bricks.—Colonel Goodwin has sent me a specimen of Asphalte (which we already possessed) and one of a patent artificial brick, and of this last he wished to know the composition. On examination it was found to be much the same as the patent fuel, which is coarse coal dust with the pitch from coal-tar, subjected when hot to a strong pressure, so as to cause it to adhere firmly. The artificial brick however, has the coal dust reduced to a fine powder, and about 10 or 12 per cent. of coarse siliceous sand added to it, so as to give it great solidity, and it seems probable that in making them the heat is raised high enough to melt the coal dust? Colonel Goodwin informs me that it is much recommended for foundations, and for tanks and water-courses, but for these last purposes I should fear that for a time it would give a disagreeable pitchy flavour to the water, for upon putting a fragment into a cup containing rain-water for twenty-four hours the taste of tar, or rather pitch-water, was perfectly distinct : for floorings, however, these bricks would be in India quite invaluable.

Mr. Taylor's Burdwan Paving Stone.—I have been carefully examining the new Burdwan paving-stone sent down by Mr. Taylor of Toposi Colliery, and have no hesitation in pronouncing it a most valuable addition to our Indian building materials. Mineralogically described it is a

pegmatite (quartz and felspar) in which the proportion of felspar is so small that for all practical purposes, it may be called a hard, fine-grained, greyish white, laminated sandstone, with minute cloudy veins of titaniferous iron (perhaps Iserine or Nigrine?) in very fine granular specks of much brilliancy when seen in a bright light. The effect of these cloudy veins is to give to the polished surface of the stone much the appearance of a very coarse, dull, yellowish grey marble, speckled with black.

I made the following experiments to ascertain what were its absorbent and retentive properties as compared with new Chunar stone.

For absorbence of atmospheric moisture.—A piece of Burdwan and one of Chunar stone being carefully weighed and dried in a silver basin, both having been previously exposed for some time to the damp air of the Museum, were found to give the following results:

Chunar stone.	Burdwan stone.
Natural weight. grs. 2204	1569
When dried, 2198	1568
Loss, ..	1.

So that the Chunar stone imbibes six parts of moisture from the atmosphere, while the Burdwan only takes up one part. It was found after about a fortnight during the late excessively damp weather, that while the Chunar stone re-absorbed something more than its former weight of water, the Burdwan stone had not absorbed any! It is impossible to adduce a higher proof of the superiority of this stone in this respect.

Farther to test the stones, both were again taken in their natural state and, without any drying, weighed and put into a basin where they were covered with rain-water and left for forty-eight hours. At the end of that time they were taken out and first gently dried by pressing them in a soft cloth and then left for an hour on bibulous paper, being frequently turned over so as to dry off all the loose external water. Upon weighing them at the end of this time, when both were fairly saturated and free from external moisture, it was found that

The Chunar stone 2209 grs. had absorbed 34½ grs. or 1.561 per cent.

The Burdwan stone 1568 ditto 6 grs. 0.382 per cent.

Hence if we call the result of the first experiment the chemical absorption it is as six to one in favour of the Burdwan stone, and if we call the second experiment the mechanical absorption, this is about the same, being as 0.382 to 1.561, or as four to one in favour of the Burdwan stone.

Mr. Taylor has already large demands for this stone, but has very handsomely offered to supply the Society at a very reasonable rate with slabs for paving the lower floor. I have no hesitation in saying that such a pavement, though less shewy, would be, for all practical purposes there, almost equal to marble, which costs one rupee four annas per square foot.

Copper ores exported in slags.—I have on more than one occasion, when consulted as to the working of copper ores in this country, strongly advised beginners not to attempt at first the refining process by which marketable copper is produced, which is always best performed on a large scale, and by men of long experience in such work; but to fuse their ore, after roasting it, into slags, and to export these to the smelters in England where their market value would be properly known, and that they could thereupon safely calculate their returns.

Mr. Theobald, Senr. acting upon this advice in some experiments which Mr. Mackenzie was undertaking with him in the Singboom territory, smelted his ores to the slags upon the table, which I forwarded to a friend in Swansea, who placed them in the hands of Messrs. Bath and Sons, professional assayers there, whose report, as that on the first parcel of Indian copper so sent to Europe, is well worth placing on record.

"Our assayer has carefully tested the samples thou sent us, they contain about 50 per cent. of iron which makes them very difficult to smelt, and is also very prejudicial to their sale; we think however, that the prices affixed to them may be obtained.

We are thy sincere friends,

(Signed) HENRY BATH AND SONS.

Mining Office, Swansea, 8mo. 19th, 1854.

No. 1, copper 42½ per cent.	£37.0.0	per 21 cwt.
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No. 2, " 41 "	35.15.0
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No. 3, " 39 "	34. 2.0
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No. 4, " 36 "	31. 0.0
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Dr. Campbell on Darjeling copper.—The following copy of a letter from Dr. Campbell, Superintendent of Darjiling, to Government gives an account of that gentleman's very persevering efforts to test the value of his copper ores.

No. 229 of 1855.

To H. PIDDINGTON, Esquire,

Curator, *Museum Economic Geology, Asiatic Society, Calcutta.*

SIR,—I have the pleasure to send you copy of my last letter to Government on the progress of my copper diggings. I shall keep the Society regularly informed of any improvement in the quality of the ores.

I have the honor to be, Sir,

Your most obedient servant,

A. GUNDOOT, Superintendent.

Superintendent's Office, Darjeling, the 19th April, 1855.

To W. GREY, Esquire,

Secretary to the Government of Bengal, Revenue Department,

With the Hon'ble the Lieut.-Governor, Camp, Gyah.

Camp, Titalyah, the 16th February, 1855.

SIR.—In my letter No. 591, dated 24th November last, I applied for the sanction of the Lieut.-Governor to the expenditure of Rs. 100 in digging out copper veins discovered in the Darjeling territory. This was agreed to, under date 5th December last, No. 87, and I accordingly put men to work.

2nd. After fifteen days' operations on the Pushak and Mahaldiram veins I forwarded specimens to the Asiatic Society for examination and for comparison with the ore taken from each of those veins during last year.

3rd. Annexed is a letter, original, from the Curator of the Museum of Economic Geology, dated 19th January, which is encouraging to further operations, and I am able, in addition to this, to state that the people who have been employed by me to dig out the ore are hopeful of improvement, especially in the Mahaldiram veins.

4th.—Being reluctant to recommend further outlay which I could not well controul, and being at the same time confident of the propriety of further operations below the surface, I submitted specimens of the ordinary copper of the Nipal mines to a person in Calcutta to ascertain its market value, intending if the price that could be given at Darjiling, for similar copper of our own would induce private persons to smelt our ores, to propose to Government to buy up the metal, or to sanction my offering the purchase of copper to a tradesman under some arrangement with Government for the privilege of purchasing.

5th.—I found however, that the price which could be safely given at Darjiling, twenty-five rupees per maund, would not induce the men who had been employed by me and who best knew the quality of the ores, to work the veins on their own account in the above described manner. Disappointed in this effort to go on with the operations without outlay by Government, I proposed to these persons that they should work the Pushak and Mahaldiram veins for their own benefit under some arrangement to be made with Government, but they declined the offer. After these men declined this proposal, I was about to submit to Government a plan for carrying on operations on a larger scale of outlay than hitherto, although I could not well undertake to look strictly after them, when they made me an offer of 100 rupees per annum for the privilege of working all the copper veins now known, or which might be afterwards found in the Darjeling territory.

6th.—I would not agree to submit an offer of this kind for an indefinite period, but I agreed to recommend to Government that they should have a farm of the veins now known (six) for one year for one hundred rupees; and as it is of primary importance to Government to ascertain the real value of the veins, and this cannot be done without sinking shafts or driving galleries at an expense which cannot well be estimated I consider that this is the best plan we can adopt; I therefore have the honor to recommend it for the sanction of the Lieut.-Governor.

7th.—In the meantime I have given the applicants Rajmon and Buktawur Singh, permission to go on digging out the Mahaldiram vein for one month.

8th.—If this proposition is agreed to, I shall make a point of submitting specimens of the ores monthly for examination and analysis, so that we may be fully and accurately informed of the result of the diggings.

I have, &c.

(Signed) A. CAMPBELL, *Superintendent.*

True copy.

Cuttack iron ores.—In reply to an application from the Hon'ble the Governor of Bengal for a report on Mr. Samuells' iron ores from Cuttack the following was sent in.

To HOPKINSON PRATT, *Esquire,*

Under Secretary to the Government of Bengal.

SIR,—In reply to your letter No. 330 of 21st March, I have the honor to report as follows:

1. That Mr. Samuells' iron ore marked Kunkerie No. 1 is the "Ochry red iron ore" of mineralogists, which produces excellent iron without the aid of fluxes.

2. A specimen of this ore from Burdwan was carefully analysed by me in 1828, and gave as much as 84 per cent. of peroxide of iron equal to 59 per cent. of iron, but this was a very pure specimen containing only 9 per cent. of earthy matters and 6 per cent. of water.

3. Mr. Samuells' specimen is evidently a mere surface one, and has thus a much larger proportion of earthy matters, the oxide of iron being gradually dissolved and washed out of such specimens by the rain water filtering through them: it contains in 100 parts

Water and carbonic acid,	5.50
Earthy silicates,	28.40
Peroxide of iron,	66.00
	—————
	99.90
Loss,..	.10
	—————
	100.00

4. This would give but 46.8 per cent. of metallic iron in this ore, but no doubt a better chosen specimen from a deeper bed or a deeper part of the same bed might equal that of Burdwan. In Bohemia where this ore occurs largely it is much prized. The report of our bazar people* quite confirms Mr. Samuels' account of the good qualities of the iron.

5. No. 2, Paleyra ore.

This ore is a mixture of the hydrated carbonate of the protoxide of iron, with a large proportion of earthy matter. On calcination, it changes from a very dull greyish red to a bright chocolate red.

It contains in 100 parts

Water,.....	9.76
Earthy silicates,	27.20
Protoxide iron,	60.60
Ox. manganese,	2.10
	99.66
Loss,..	.34
	100.00

6. This amount of protoxide of iron represents 47 per cent. of metallic iron, and from the presence of the manganese, it would probably be of a good quality.

7. As connected with the great interest which iron ores and their fluxes and smeltings have at this time, I beg to annex to the present report a paper just drawn up by me for the Journal of the Asiatic Society which already shews that the problem of the smelting and fluxes (if the kunkurs can be found in sufficient quantity) has long been practically solved by Mr. Taylor of Burdwan.

I have the honor to be, Sir,

Your obedient servant,

(Signed) H. PIDDINGTON,
Curator, *Museum Economic Geology.*

Museum, the 14th April, 1855.

Coal from Thayet Myo, Pegu.—I reported last year, Journal Vol. XXIII. p. 714, on specimens of coal brought from Ava by Capt. Niblett of the Sesostris, which was brought to Rangoon by the Burmese from fields beyond the British territory. Since that time as is now well known, coal has been discovered at Thayet Myo within the British boundary. I obtained a specimen of this coal through the kindness of Captain Niblett of

* And as they do not import iron their opinions are unbiassed.

the H. C.'s Steamer Sesosstris and a memorandum forwarded by me to the Hon'ble the President in Council and to Major Phayre with a copy of the paper referred to above, was as follows:—

MEMORANDUM.

Coal from Thayet Myo within the British territory in Ava and two miles from the banks of the Irrawaddy brought up by Captain NIBLETT of H. C.'s Steamer SESOSTRIS.

1. In appearance the same as the Ava coal No. I. of the foregoing paper but more compact.

2. A great deal of shale mixed with it and much of it is *top coal* (or upper layers only) but there is abundance of the good coal, shewing that the vein has only to be properly mined to furnish good coal. Nothing is said as to its thickness or extent.

3. It flames well but does not melt. Powder cokes—coke of the coal duller than No. I. but like it burns very slowly. The ash is of a dull muddy red.

4. Its specific gravity is,..... 1.36

Its contents in 100 parts are:—

Water,	2.50
Gaseous matters,	30.25
Carbon,	64.10
Ash,	3.15
<hr/>	
	100.00

5. Hence it is in fact the same coal as No. I. the differences not being of importance or greater than those which often occur with specimens from the same field or even from the same mines.*

H. PIDDINGTON.

Fossil wood from Ava by Capt. Hill.—Captain Hill of the Bankshall has obliged us with a very fine specimen of fossil wood apparently teak! from Ava.

H. PIDDINGTON.

* I regret to learn from Mr. Theobald, Junr. that the vein of this coal which he terms a lignite has been found to diminish suddenly, and that moreover that the formation in which it is found gives no hope of any true coal being discovered in it.

Report for October Meeting, 1855.

The donations received during the last three months are as follow:—

1. Sir J. Brooke, K. C. B., Sarawák: Fine skeletons of a large adult Orang-utan, in addition to the two mentioned in my last Report (p. 469 *ante*). A memoir on these skeletons has already been submitted for publication.*

2. Capt. Berdmore, Schwe Gyen, on the Sitang river, Pegu. A collection of numerous sundries.

Among mammalia, two specimens of a new Shrew (*SOREX FULIGINOSUS, nobis*, p. 362 *ante*),—a *TUPAI* in spirit,—and a skin of *SCIURUS KERAUDRENII*.

Of birds, *MICROPTERNUS PHAILOCEPS* in spirit, and numerous specimens of *EMBERIZA AUREOLA*.

Of reptiles, seven living examples of *EMYS OCELLATA*, D. and B., and one of *CISTUDO DENTATA*; a dried young specimen of the very remarkable *PLATYSTERON MEGACEPHALUM*, Gray, previously only known from China; *EMYDA PUNCTATA*, very small; *HEMIDACTYLUS FRENATUS*; *PIPIPIA PERONII*; *DRACO LINEATUS* (*Dracunculus* apud Gray, a name long previously bestowed on the ‘Guinea-worm’); *CALOTES MYSTACEUS*; *C. EMMA*; *LEIOLEPIS REEVESII*; *TIQUA MACULARIA*; *RIOPA ALBOPUNCTATA*; *MONITOR SALVATOR*; *LYCODON AULICUS*; *LEPTOPHIS ORNATUS*; *DIPSAS FER-BUGINEA*, Cantor, var.; *TRIGONOCEPHALUS GRAMINEUS*, Mal. var.; *MEGALOPHYS GUTTULATA*, n. s.; *RANA VITTIGERA*; *R. ALTILABRIS*, n. s.; *ENGYSTOMA(?) BERDMOREI*, n. s.; *R. —?* (young); and tadpoles of probably our new *RANA FUSCA*, to be described presently; also *BUTO MELANOSTICTUS*.

Likewise an interesting series of land-shells; and a bottle of insects in spirit.

The novelties and rarities comprised in this collection will be brought under notice together with those presented by Mr. Theobald.

3. W. Theobald, Esq. Junr.; attached to the Government Geological Survey. Another rich collection of sundries, from Mergui and the valley of the Tenasserim river.

Of mammalia, the skeletons of a fine mature male of *HYLOBATES LAR*, and one of *RHIZOMYS SUMATRANUS*. Sundry *exuviae* of *PRESBYTIS OBSCURUS*, Reid (to which *Pr. Barbei*, *nobis*, may now be definitively referred as a slight variety). Specimens in spirit of *MEGADERMA SPASMA*, *HIPPOSIDEROS MURINUS*, *TAPHOZOUS SACCOLAIMUS*, *T. LONGIMANUS*, *NYCTICEJUS TEMMINCKII*, and *CYNOPTERUS MARGINATUS*; *SOREX MURINUS* (*verus*).

* *Vide p. 518, ante.*

and *S. NUDIPES*; also *MUS BANDICOTA*, *M. SETIFER* (?), and *M. BERDMOREI*, nobis: and frontlet of the Markhor (*CAPEA MEGACEROS*), from Kashmir, with tensely spiral horns (or which are straight, having a prominent ridge wound round them.)

Of birds, head of *BUCEROS SUBRUFICOLLIS*; and eggs of *HALCYON GURIAL*, *MEROPS ERYTHROCEPHALUS*, *FRANCOLINUS PHAYREI*, *HOPLOPTERUS VENTRALIS*,—and also of a reptile, *GECKO VERUS*.

Of reptiles, shells of *TESTUDO ELONGATA*, nobis (*J. A. S. XXXII*, 639),* *EMYS TRIVITTATA*, *E. OCELLATA*, *E. NIGRA* (*n. s.*), *E. PLATYNOTA* (?), var. ? *CISTUDO DENTATA* (adult), and *TYRSE GANGETICA* (with also the newly hatched young in spirit),—head of *CROCODILUS POROSUS* (*biporcatus*, Cuv.)—and specimens in spirit of *LEIOLEPIS REEVESII*, *ACANTHOSAURUS ARMATUS*, *CALEOTES MYSTACEUS*, *C. EMMA*, *DRACO MACULATUS*, *TACHYDROMUS SEXLINEATUS*, *TLIQUA RUFESCENS*, *T. MACULARIA*, *LYGOSOMA AURATA*, *ARGYROPHIS BICOLOR*, Gray (*Typhlops nigro-albus*, D. and B., 15½ in. long), *ARG. BRAMINUS*, *XENODON PURPURASCENS*, *COLUBER MUCOSUS*, *C. RADIATUS*, *C. PRASINUS*,† *LEPTOPHIS PICTUS*, *DIPSAS CYNODON*, *D. FERRUGINEA*, *Cantor*, *TRIPODONOTUS UMBRATUS* (Mal. var.), *TR. SUBMINIATUS*, *TR. JUNCEUS*, *Cantor*, *TR. NIGROCINCTUS* (*n. s.*), *BUNGARUS FLAVICEPS* (rare), *NAIA LUTESCENS* (black var., without trace of the spectacle-marking on the body,—below whitish with one dark band underneath the hood), *TRIGOcephalus GRAMINEUS* (2 vars.), *HYDRUS GRACILIS*, *H. STRIATUS*, *H. NIGROCINCTUS*,—*POLYPEDATES LIVIDUS* (*n. s.*), *P. LEUCOMYSTAX* (var.), *LYMNODYTES ERYTHRÆUS*, *L. NIGROVITTATUS* (*n. s.*), *RANA FUSCA* (*n. s.*), *ENGYSTOMA INTERLINEATUM*, *HYLÆDACTYLUS BIVITTATUS*, and *BUFO MELANOSTICTUS*.

Of fishes, a curious little *COBITIS*-like *Siluroid*, affined to *BAGRUS*, but apparently constituting an entirely new generic form, described neither by Valenciennes nor by Dr. Bleeker; also a small specimen of *AMPHIPINNUS CUCHIA*, (B. Ham.); and examples of two Bengal species of *TETRAODON*, viz. *T. FLUVIATILIS*, B. Ham. (unique type of *DICHOTOMYCERIS*, Bibron, *Rev. et Mag. de Zool.* 1855, p. 279), and *T. CUTCUTIA*, B. Ham. (unique type of *MONOTRETUS*, Bibron, *ibid.* p. 281, and probably of *LEIODON*, Swainson, *Class. Fish.*, 'Nat. Libr.', II, 194, the species being

* A number of living specimens have since been received from Capt. Berdmore. Colour of naked parts olive-grey, varied with dull pale yellow and with black: head conspicuously dull yellowish-white.

† Of two specimens about equal in length, one (retained by Mr. Theobald) measures 6 ft. 10 in. To measure the other would now be inconvenient, as to remove it from the bottle might perhaps injure the specimen.

also *Leiosomus marmoratus*, Swainson apud Bleeker, *sed loc. non cit.*) The last three species, common in Bengal, were not observed by Dr. Cantor further south, in the Malayan peninsula; and they were obtained by Mr. Theobald in Mergui. The same remark applies to one or two of the reptiles, as especially *COLUBER MUCOSUS*.

Of Mollusca, an extensive collection of land and fresh-water shells, which (together with those presented by Capt. Berdmore from Pegu) has considerably enriched our cabinet, which previously contained few species from that range of country.

Lastly, of Crustacea, a small *SQUILLA*, which approximates the description of *Sq. MICROPTHALMA*, M. Edw., *Hist. Crust.* II, 523; but the *griffes* (or seizers) are armed on the last articulation with 5 teeth, the first of which is unusually elongated, and there are also 3 moveable spines towards the base of their penultimate articulation: thorax remarkably short, and much contracted anteriorly: eyes as described of *Sq. MICROPTHALMA*; the *cornea* minute: six very slight ridges along the abdomen; and its last segment bearing a mesial ridge, and numerous tubercles more or less united into vermiculated raised lines, with 6 principal spines posteriorly and other and smaller spines between them. Entire length, from ocular peduncles, $3\frac{1}{2}$ in. If new, *Sq. BIARMATA*, nobis.

We may now proceed to notice the various *notabilia* contained in the collections presented by Capt. Berdmore and Mr. Theobald.

EMYS NIGRA, nobis, n. s. To judge from the shell alone, this species would seem to be affined to *E. CRASSICOLLIS*; but Mr. Theobald assures us that it is not remarkable for thickness of neck. What appear to be adults, measure from $6\frac{3}{4}$ to $7\frac{1}{4}$ in. long. The young have a prominent mesial ridge above, continued throughout; and two slight and proximate lateral ridges, similar to those of *E. CRASSICOLLIS* but less developed. In the presumed adults these ridges appear to be worn away, as if by attrition; and even the mesial disappears excepting on the last and penultimate of the vertebral plates. Nuchal plate quadrilateral, and broader posteriorly; shewing a distinct ridge in the young: first vertebral elongate-triangular, with base to the front and truncate apex; the next two similar but broader, with anterior base rounded almost to a semi-circle; the fourth more or less hexagonal; and the fifth triangular with posterior base: caudals large and square: posterior marginal plates strongly serrated in the young, with four denticulations on each side, successively diminishing to the middle: of the sternal plates, the third pair are more than twice as large as the second; whereas in *E. CRASSICOLLIS* the second pair are as large as, and often larger, than the third. In the adults, the whole

shell is black, with a slight admixture of whitish underneath : in the young the shell is black above, yellowish-white below, with black radiating from the exterior hind corner of each plate. A common species along the valley of the Tenasserim ; but an inhabitant of marshy jungles, rather than of the river.

E. PLATYNOTA (?), Gray : var.? Carapax only ; the plastron wanting. Length 13 in., by 9 in. Above black, with yellow mesial ridge, which is distinct, though not prominently developed : marginal ridge prominent ; and below this the colour is bright yellow, handsomely rayed with black : posterior marginal shields each terminating in an obtuse point, occasioning the hind margin of the carapax to be deeply serrated : nuclei of costal shields placed high, as near to the summit as the middle ?*

CISTUDO DENTATA, Gray ; Cyclemys orbiculata, Bell ; &c. A specimen of this was presented by Major Phayre from the Irawadi (p. 481, ante) ; another and small living example, since dead and mounted, by Capt. Berdmore, from the Sitang river ; and the shell of an adult, from the Tenasserim, by Mr. Theobald : length of the last 8 in., breadth 6 in., and height 3½ in.

CALOTES MYSTACEUS, D. and B. Upon minutest comparison of Burmese with Cinghalese examples, we can detect not the slightest difference between them.

C. EMMA, Gray. This pretty species, distinguished by its post-orbita spine, is subject to considerable variation of colour. In general, there is a strongly marked broad white or rosy-white lateral band, continued from the setting of the head to that of the tail ; which in some is interrupted more or less, in others scarcely interrupted, by a series of 7 or 8 black transverse bands : sometimes the white longitudinal band is strongly developed, whilst the black transverse bands are scarcely visible ; and vice versa : and sometimes, again, neither is strongly marked. There is always a black line through the eye, extending to the tympanum ; and in general more or less black on the throat, especially in the adult males : but familiar experience of the changes of colouring assumed by the com-

* GEOMYDA TRICARINATA, nobis, n. s. A small land Terrapin from Central India (Chaibásá). Shell 5½ by 3½ in ; obovate, broader posteriorly : of a dark reddish-brown colour above, with three yellow longitudinal ridges, which are flat and obtuse ; below pale dull-yellow. Claws long, stout, and considerably hooked. Soles expanded, indication of terrene habits. Dorsal shields hexagonoid ; the third and fourth broader than long ; the fifth approximating a triangular form, with posterior base : nuclei of costal shields placed high, and traversed by the low lateral ridge.

mon C. VERSICOLOR of Bengal demonstrates (as its name implies) the merely transient character of these variations.

TACHYDROMUS SEXLINEATUS, Daudin. This remarkable Lizard, with tail more than twice as long as the head and body, has previously been met with in China, Cochin-china, Java, and Borneo. A specimen procured in Mergui by Mr. Theobald minutely accords with the description by M. M. Dumeril and Bibron in every detail of structure; but the colouring would seem to be unusually dull. We have no doubt respecting the correctness of the identification. Length of specimen 9 $\frac{1}{4}$ in., of which tail 7 in.

TILIQUA MACULARIA (*Euprepes macularius*, nobis, J. A. S. XXII, 652). This species was procured both by Capt. Berdmore and Mr. Theobald; and the habitat formerly given with a note of doubt is probably erroneous. With five specimens before us, we do not hesitate to place it in the genus TILIQUA, Gray: where it may be readily distinguished from the common *T. RUFESCENS*, by having the first lateral post-nasal plate scarcely a quarter the size of the second; whereas in *T. RUFESCENS* the same plate is more than half the size of the other referred to. The coloration of the two species is also conspicuously different.*

DIPSAS FERRUGINEA, Cantor, (*vide J. A. S. XXIII*, 293). The range of this species extends from Sikkim and Asám to Pegu and Mergui. Its considerable variation of colouring demands notice, and would seem to depend on age. This tree-Snake does not appear to grow beyond 19 or 20 in. long, and then increases only in bulk or thickness. A fine adult procured in Mergui by Mr. Theobald is chiefly blackish above, with a series of large pale (but not strongly contrasting) spots along the spine, more or less double and alternating, but the first three or four from the head are single and mesial: lower-parts pale yellow, with a mesial line of irregular black specks, gradually increasing in number and more confluent posteriorly, until, about the middle of the body, the black predominates over the yellow, and finally leaves but a few yellow specks sprinkled upon the black; throat and sides of face also black, continued over several of the series of abdominal scutæ: head marked as usual, with a pale line proceeding backward from each nostril, the two joining posteriorly to the eye

* Here it may be remarked that a small Monitor procured by Mr. Theobald in the Punjab Salt Range, appears perfectly identical with the PSAMMOSAURUS SCINCUS, (Merrem), common in N. E. Africa. We have before remarked this species from Upper Hindustán. A TORTRIX or ERYX, also, from the Salt Range, seems to be different from the common species or variety of Upper India, *E. INDICA* of Gray.

and abruptly ceasing on the crown ; these and other markings variegating a black ground in a manner difficult to describe in few words. Abdomen finely iridescent ; and the tail short and suddenly tapering. In a younger specimen, nearly as long but much less thick, the black colouring is considerably less developed, and but few of the pale spots are traceable along the spine : but there is a well defined broad dusky lateral band, and below this another and narrow dark line margining the series of abdominal scutæ. In a young specimen (12½ in. long), sent from Pegu by Capt. Berdmore, the colouring of the upper-parts is plain dull rufous, with scarcely an obscure trace of markings ; and that of the lower is bright orpiment-yellow, the surface brilliantly shining as in the others, with minute black specks on the throat and hinder half of body underneath, and a row of small yellow spots bordering the lower jaw, which last are more or less distinguishable in the other specimens. It would seem that the tail of this young Snake was white or whitish when alive, for its terminal four-fifths, abruptly separated : for Capt. Berdmore designates it "a small brick-coloured Snake with a white tail ;" and remarks that "it carries this white tail curved up."

TROPIDONOTUS JUNCEUS, Cantor, *J. A. S.* XVI, 940 : var. *Tr. dipsas*, nobis, *ibid.* XXIII, 297.—*TR. MACROPS*, nobis, *ibid.* is nearly affined, but distinct ; having a much shorter tail, and wanting the lateral rows of spots on the abdominal scutæ ; which spots are present in *TR. PLATYCEPS*, nobis, and also in *HERPETODRYAS HELENA*, (Daudin), which also is considerably affined, but is readily distinguishable by its much smaller eye and less strongly carinated scales. In Burmese specimens of *TR. JUNCEUS*, the neck and first fourth or fifth of the body are of a vivid olive-green approaching to grass-green, marked with a series of mesial black spots more or less distinct ; the colour then passes to greyish, and is marked with two alternating lateral rows (one on either side) of transversely elongated white spots, in some very distinct and conspicuous, in others obscure ; and these are more or less distinctly continued to the end of the tail : there is also a dark band through the eye, and below this the throat is bright yellow in the young, a streak of the same passing up to meet its opposite upon the nape ; this bright yellow gradually passes off to yellowish-white posteriorly, where the green passes to grey above ; in some the throat and v-like mark on nape are white, and the latter is more or less imperfect. In the Sikkim variety (? *Tr. dipsas*), there is an interrupted dark lateral band continued backward from the nape-mark ; and the double series of white spots above it commence from the nape, and are longitudinal, rather than transversely elongated, as in the Burmese race : the

black line through the eye is narrower and more distinctly defined, and is even continued forward round the nose; and the labial plates above and below are more or less black-margined. Whether the two races are local, or merely casual varieties of the same, remains for observation to determine.

TR. NIGROCINCTUS, nobis, n. s. Another beautiful species, affined to the last, but at once distinguished from it, structurally, by the extraordinarily large size of its penultimate and ante-penultimate upper labials (posterior to the eye): the occipital plates are also proportionally smaller. Colour, olive-grey above, passing (like the last) to bright green towards the head; and conspicuously marked throughout with a series of about 50 narrow transverse black bands, some perfect, others broken and alternating: head with two broad black lateral streaks, one from behind the eye to the cleft of the mouth, the other below the eye: a narrow and indistinct black band edging the occipital plates posteriorly; and behind this, a broad pale collar, which was probably bright red above in the living Snake; and this red colour would seem to have extended upon the cheeks between the two broad black *striæ*: lower-parts white, each *scuta* beginning to be margined with grey from about the twentieth; and this grey gradually darkening posteriorly, until towards and upon the tail it becomes blackish and occupies about half of each *scuta*; besides which a row of small lateral spots may be traced, corresponding with those of the preceding and certain other species. Rows of scales 17: abdominal *scuta* 160; subcaudal *scutellæ* 81 pairs: length of specimen 26½ in., of which tail 6½ in.

BUNGARUS FLAVICEPS, J. Reinwardt, apud Cantor, *J. A. S.* XVI, 1033. Specimen 46½ in. long, of which tail 7½ in.; the hexagonal row of scales along the spine highly compressed and tectiform. As shewn by the present specimen, Dr. Cantor's supposed distinctions of colouring of the adult and young are rather those of individual variation.*

MEGALOPHRYNS GUTTULATA, nobis, n. s. A species of remarkable beauty; and belonging to a very different subtype from that to which the great 'edible frog' of Sikim (*M. GIGAS*, nobis, *J. A. S.* XXIII, 299), is referable. Tympanic membrane distinct, though much contracted: fore and hind-limbs subequal; the hind-toes short and but slightly webbed. Length of the larger of two specimens, from snout to vent, 3½ in.; of extended fore-limb 2½ in.; and of extended hind-limb 3¾ in. In the great Sikim *MEGALOPHRYNS* (?), the hind-limbs are nearly four times the

* Unfortunately, this rare Snake has received injury from the attacks of ants. When alive, its head and tail were bright red, as Dr. Cantor describes.

length of the anterior limbs; and the hind toes are long, with interdigital membranes well developed. It is as obvious than the present species is a 'Tree-frog,' as that the other is not so: and the proportions of *M. GUTTULATA* would indicate it to be a *crawler*, rather than a *leaper*; whereas *M. (?) GIGAS* is as obviously a powerful leaper, and as aquatic in its habits as our common 'Golden Frog' (*RANA TIGRINA*). The two specimens of *M. GUTTULATA* presented by Capt. Berdmore were, he remarks, "beautiful creatures of their kind; the colours being bright: the eyes are bright red with a light blue circle round them." These fine colours have disappeared in spirit, but it is easy to perceive that they had been vivid. At present, the back appears of a plumbeous olive-green, with numerous large round spots more or less confluent, of a light dusky colour, the appearance of which may be compared to that of drops of water on an oily surface, tending to unite and flow together: limbs banded with the same colours: the skin of the lower-parts is granulose throughout, and appears to have been orange, marbled and variegated with dusky; one of the specimens having the throat entirely of the latter hue. The tips of the toes are scarcely dilated. Inhabits Pegu.

POLYPEDATES LIVIDUS, nobis, n. s. As compared with the common *P. LEUCOMYSTAX*, this species attains to triple the size, and has the legs and toes proportionally much longer, and the hind-toes are completely webbed (as in *P. MARMORATUS*, nobis, p. 188 *ante*). Length, from snout to vent, $3\frac{1}{2}$ in.; of extended anterior limb $2\frac{1}{4}$ in.; and of posterior limb $6\frac{1}{2}$ in. General form more gracile, and the muzzle less obtuse, than in *P. LEUCOMYSTAX*. Skin smooth, and slightly granulose only on the hind surface of the thighs. Colour uniform dusky-plumbeous above, probably dull olive-green when alive; below whitish; and the membranes of the hind-toes dusky. A specimen one-fourth the size accords minutely in all other respects: but a number of what Mr. Theobald considers to be the young differ in having the tympanic membrane proportionally much larger, and also much nearer the eye; the general hue being paler, and the upper lip more conspicuously white than in the grown animal. We are satisfied that Mr. Theobald is correct in assigning them to the same species. Inhabits the Tenasserim valley,

LYMNODYTES NIGROVITTATUS, nobis, n. s. In this genus it is not always easy to discriminate between species and varieties; but two very distinct races were obtained by Mr. Theobald, one of which accords with specimens from Arakan and from Dacca, and also with Dr. Cantor's description of *L. ERYTHRAEUS* (*J. A. S.* XVI, 1262). The other, named as above, has distinctly a more obtuse muzzle, and much smaller hind-feet; the

coloration also being conspicuously different. Colour ruddy-plumbeous above, below albescent, with a broad blackish band extending from the nostril to the base of the hind-limb, which band has merely a slight palish margin above (representing the broad white stripe of *L. ERYTHRÆUS*), but is bordered below by the subdued white of the under-parts, and in some specimens there are a few dark spots which tend to run together into a line, and so to form a second and narrower dark band from the fore to the hind-limb: posterior surface of fore and hind-limbs much marbled and spotted with black; their anterior surface less so, and the breast would seem in some to be more or less speckled. Length of specimen 2 in., of fore-limb $1\frac{1}{8}$ in., and hind-limb $3\frac{1}{8}$ in., the foot $1\frac{3}{8}$ in. Another closely allied species occurs in *L. MACULARIUS*, nobis (*J. A. S.* XXIII, 299), from Ceylon; and this again is distinct in its markings, has the upper lip more projected beyond the lower, and the tympanum is larger and more approximated to the eye. A fourth species (*L. LIVIDUS*, nobis, *ibid.*), also from Ceylon, is again very distinct, and much larger than the others, and this is probably gaily coloured when alive. Our specimen has its thighs broken, which may be presumed to indicate that it is eaten, and was thus crippled to prevent its escape; a cruelty which is practised with other kinds of 'edible frog' by Asiatics. Lastly, Mr. Jerdon describes a small *C. PHILOPHYLLA* (*J. A. S.* XXII, 533), as common in the western forests of the Indian peninsula.

RANA FUSCA, nobis, n. s. Large Frog, of a prevailing dark olive-grey or mud-colour above, white below; and the eye of the adult situate midway between the tympanum and nostrils: in the young (as in other species) the tympanum is placed nearer the eye: male devoid of vocal sacs. Skin subgranulose above and smooth below. A narrow pale dorsal streak in some specimens only. Upper lip black, as also the ridge commencing at the corner of the eye and continued over the tympanum. Some have the upper-parts plain, or with scarcely a trace of variegation: others have a few black spots and marblings; but the limbs are always more or less distinctly banded, and the posterior surface of the thigh is prettily marbled. Toes chiefly white, with dusky membranes. Margin of the lower jaw dusky, interrupted by a mesial and three or four lateral white spots. Length of adult 5 in., of fore-limb $2\frac{1}{8}$ in., and of hind-limb 8 in.: foot $2\frac{1}{2}$ in. The presumed tadpoles are of proportionate size, attaining to 3 in. in length before the anterior limbs make their appearance; and are of a dusky mud-colour, with a large lateral black spot on the body, and series of 3 or 4 smaller black spots along the sides of the tail. This species is common in the Tenasserim valley, and is eaten by

the natives: accordingly, some of the specimens under examination have the thighs, and others the legs, broken. The presumed tadpoles are from Pegu.

R. ALTILABRIS, nobis, n. s. A much smaller species than the preceding, with the hind-limbs proportionally shorter: the eyes small and elevated; and the vertical breadth from the eye to the mouth about double the usual proportion. A line drawn from the nostril to the middle of tympanum would pass under and not bisect the eye. Colour livid-dusky above, white below, freckled with black specks on the throat and sides, and on the anterior margins of the limbs: lips banded with dusky; and the limbs very obscurely banded. Length of specimen $2\frac{3}{8}$ in.; of fore-limb $1\frac{1}{8}$ in.; and of hind-limb $3\frac{3}{8}$ in.: foot $1\frac{1}{2}$ in.; and distance from eye to margin of lip $\frac{1}{4}$ in. Inhabits Pegu.*

ENGYSTOMA (?) *BERDMOREI*, nobis, n. s. This is not a true *ENGYSTOMA*; but we have no means of referring it to its proper genus. The fore-limbs are small and slender,—the hind enormously developed, with fully webbed toes: head small, and no external tympanic membrane. Length $1\frac{1}{2}$ in., of fore-limb $\frac{1}{4}\frac{5}{8}$ in., and of hind-limb $2\frac{7}{8}$ in.; the foot $1\frac{1}{4}$ in. Colour dusky above and on the throat; rest of lower-parts reddish-white: some black spots on the sides, and interrupted bands on the limbs. In young individuals, a dusky bottle-like mark appears on the upper-parts, with the neck of the bottle, extending from between the eyes to between the shoulders: in adults this becomes inconspicuous, but is distinctly traceable. Apparently a common species in Pegu.

ENGYSTOMA INTERLINEATUM, nobis, J. A. S. XXIII, 732. The variation of colour in this species is extraordinary. In a female with ova, $1\frac{3}{4}$ in. long, with hind-limb $1\frac{7}{8}$ in., the markings are as formerly described, only they have become much less distinct, while a great pale-edged black spot has become intensely developed, adjoining the base of each thigh above: in the former specimen, these black spots may be seen in process of development, at the ends of the two streaks which diverge from between the shoulders. In a male, the entire upper-parts are pale and have a rosy tinge, with the same black spots conspicuously developed, while the remains of the longitudinal striae are barely traceable. All are probably very beautifully coloured when alive.

4. F. Skipwith, Esq. C. S. A small collection of sundries, from Cherra Punji in the Khásya hills; and some good land-shells from Sylhet. Among the Cherra specimens are three species of Mice in spirit, all of

* *R. robusta*, nobis, J. A. S. XXIII, 298, is (we are now satisfied) a phase of *R. CUTIPORA*, D. and B.

which appear to be undescribed; also *SOREX GRIFFITHII*, Horsfield (erroneously assigned by that gentleman to Afghánistán; being identical with the supposed *S. MURINUS apud nos*, p. 28 *ante*; and the true *S. MURINUS* having now been presented to our museum from the Tenasserim valley by Mr. Theobald):—of reptiles, *ARGYROPHIS BRAMINUS*, *DRYINUS PRASINUS*, and the young of the fine *COLUBER NIGROMARGINATUS*, *nobilis* (*J. A. S.* XXIII, 290), a species previously received only from the vicinity of Darjiling.

The three species of Mice from Cherra may be thus characterized.

Mus GLIROIDES, *nobilis*, *n. s.* This has very much the aspect of the British Dormouse (*MYOXUS AVELLANARIUS*); but what little remains of the tail of the only specimen sent is nude, and the colouring is much less bright, though inclining to the same hue. It would seem to represent a very distinct-division of the great genus *Mus*; but the specimen is evidently young, and more and better examples are needed for a satisfactory examination. Fur exceedingly dense and fine, nearly $\frac{3}{8}$ in. long upon the back, and of a light brown colour tinged with fawn externally, the piles dusky-ash for the basal two-thirds or more: lower-parts white, very faintly tinged with fawn; the white purest about the lips and chin: whiskers long, copious and fine (like those of *MYOXUS AVELLANARIUS*): feet large, and clad scantily with white hairs; but a distinct dark brown mark upon each hind-foot, reaching almost to the division of the toes: ears rather small, ovoid and naked. Length of head and body 2 in.; tail —— ?; ears posteriorly $\frac{5}{16}$ in.; and tarse $\frac{5}{8}$ in.

M. ERYTHROTIS, *nobilis*, *n. s.* Another and very different form of Mouse from the last, and equally from the common house Mouse. Length of head and body $2\frac{1}{4}$ in.; tail $2\frac{3}{8}$ in., and consisting of about 26 vertebrae: ears small and hairy, $\frac{5}{16}$ in. long externally: hind-foot and claws $\frac{1}{2}\frac{1}{8}$ in. Fur long and very dense; of a rich dark brown colour, grizzled, and brightly tinged with rufous or rufo-ferruginous towards the tail and upon the ears conspicuously: lower-parts albescence, tinged with fawn: feet with brown hairs upon their upper surface; and the tail considerably hirsute. One specimen only received.

M. CUNICULARIS, *nobilis*, *n. s.* A small field (?) Mouse remarkable for its ample ears, and tail shorter than the head and body. Length of head and body $2\frac{1}{2}$ in.; of tail $2\frac{1}{8}$ in.; ears posteriorly $\frac{1}{2}$ in.; and hind-foot $\frac{1}{2}\frac{1}{8}$ in. Colour of a wild Rabbit (*LEPUS CUNICULUS*) above, below white; and the feet with brownish hairs above, but with white hairs upon the toes: tail conspicuously ringed, the setæ minute and inconspicuous. A dozen specimens are sent of this species, some of which are more or less injured.

5. R. W. G. Frith, Esq. Kulneah, JESSORE. Also a collection of sundries preserved in spirit: comprising two Bats, *KERIVOULA PICTA* (fine) and *NYCTICEJUS TEMMINCKII*;—the following birds remarkable for the locality—*GARRULAX SQUAMATUS*, *IOLE VIRESSENS*, and *HEMIXOS FLAVALA*, with the curious young of *CENTROPUS RUFIPENNIS*, and those of *NETTAPUS COROMANDELIANUS*; of snakes—*BUNGARUS ANNULARIS* (small, and bottled while in the act of swallowing a *TROPIDONOTUS STOLATUS*), *VIPERA RUSSELLII*, *XENODON PURPURASCENS* (fine), the common *LYCODON AULICUS*, *CALAMARIA SAGITTATA*, and a remarkably beautiful specimen of *DIPSAS TRIGONATA*, and the young of *HYDRUS STRIATUS*; frogs—*POLYPEDATES LEUCOMYSTAX* (var.), *HYLÆDACTYLUS BIVITTATUS* (beautifully marked variety), and an interesting series of the tadpoles of *RANA VITTIGERA*;*—fish—*SYNGNATHUS CUNCULUS*, B. Ham.; and of insects—

* In Dr. Cantor's 'Catalogue of the reptiles inhabiting the Malayan peninsula and islands,' (*J. A. S.* XVI, 1060), *R. RUGULOSA* and *R. VITTIGERA*, Weigmann, are placed as synonymes of *R. TIGRINA*. This is a mistake. Neither of the former appears ever to exceed in magnitude the British *R. TEMPORARIA*; and *R. VITTIGERA* (*v. R. assimilis, robi, passim*), is readily distinguished at any age by its semi-palmated hind-feet, the inter-digital membranes of which are not more developed than in our common Tree-frog (*POLYPEDATES LEUCOMYSTAX*). In accordance with this structure, it is decidedly less aquatic in its habits than the others are, and is found further away from water, under shelter of low herbage and growing crops, where it can derive the necessary moisture from the night-dews. It is as common as the great *R. TIGRINA*, in the vicinity of Calcutta. *R. RUGULOSA* = *R. Leschenaultii*, D. and B. *apud* Cantor, *sed nec apud* Jerdon (at least Mr. Jerdon sent to our museum a different and much larger species by that name many years ago), *v. R. bengalensis*, Gray, *apud nos (passim)*. We have not observed this species wild, but have occasionally received a lot of living adults taken in the neighbourhood. Some are distinctly marbled and variegated when alive, others not so; which is at variance with Dr. Cantor's statement. The pale dorsal line seems never to occur in this species; and is as often absent as present in *R. VITTIGERA*: but in *R. TIGRINA* it appears to be constant. Our largest male of *R. TIGRINA* measures—head and body 7 in., and extended hind-limb 9 in. Though so common, we have never remarked the tadpoles of *R. TIGRINA*; but the young frogs, measuring—head and body but $\frac{5}{8}$ in. to $\frac{3}{4}$ in., are common. At any age, this species is at once distinguished by its more gracile form, by the considerably less obtuse shape of its muzzle, and by the brilliancy of its colouring when alive. Its agility is remarkable; often taking several long lapes in rapid and continuous succession, making always for the water, and not plunging directly into it like *R. TEMPORARIA*, but taking two or three successively diminishing springs along its surface and then diving below. It is further remarkable for its extraordinary

the larva and pupa of SATURNIA ATLAS, and various other larvæ, &c., of more or less interest.

6. J. Bedford, Esq. Specimens of SULA FIBER and ANOUS STOLIDUS from the vicinity of N. Zealand.

7. Capt. C. C. Beaumont. A few specimens of fish caught in the Pilot's ridge, Lower Hugli. They consist of TRIACANTHUS ACULEATUS (remarkably fine), TETRODON LUNARIS, MESOPRION JOHNII, CORVINA CHAPTIS, and a CABANX (undetermined).

8. Capt. Jethro Fairweather. Two fine specimens of OSTRACION TURRITUS, L. (genus *Tetrasomus*, Swainson), from the vicinity of Muscat. Capt. Sherwill also presented, some time ago, a fine specimen of the curious little OSTR. DIAPHANUS, Schneider, from the C. G. Hope.

E. BLYTH.

LIBRARY.

The library has received the following accessions during the month of September last.

Presented.

Selections from the Records of the Government, N. W. Provinces, Vol. I. *Agra*, 1855, Rl. 8vo.—BY THE GOVERNMENT.

Selections from the Records of the Madras Government, No. X. Reports on Important Public Works, for 1852.—BY THE BENGAL GOVT.

A Guide to Analysis in Geological and Agricultural Chemistry. By an Officer of the Bengal Engineers, *Calcutta*, 1855, 8vo.—BY THE SAME.

Recueil des Actes de l'Academie Imperiale des Sciences, Belles-lettres et Arts de Bordeaux; seizième année, 1854, 3 Trimestre.—BY THE ACADEMY.

Beretning om Fante-eller Landstrygerfolket in Norge. Af Gilbert Sundt. *Christiania*, 1850, 12mo.—BY THE UNIVERSITY OF CHRISTIANIA.

Beretning om Bodsfængslets Orksamheds i aaet 1851-52. *Christiania*, 1854, 8vo.—BY THE SAME.

Pharmacopœa Norvegica Regia auctoritate edita. *Christiania*, 1854, 8vo.—BY THE SAME.

Klinik over Hudsygdommene og de syphilitiske, Sygdommei 1852, ved W. Boeck. *Christiania*, 1854, 8vo. pamphlet.—BY THE SAME.

habit of preying upon small birds, as was first noticed by T. Wright, Esq. of Saharanpur (*Calc. Journ. N. H.* III, 284), and of which two instances have since come to our knowledge, one of them contributed by our late Secretary, Mr. Grote. The smallest fully-formed frogs of R. VITTIGERA measure from $\frac{1}{2}$ to $\frac{3}{4}$ in. from muzzle to vent; and of this size many will be found with tail in process of absorption. We know of only these three species of true RANA in L. Bengal.

Nyt Magazin für Naturvidenskaberne, Udgives af den physiographiske Forening i Christiania ved C. Langberg. *Christiania*, 1853, 8vo. pamphlet.—BY THE SAME.

Det Kongelige Norge Frederiks Universitets Åarberetning for 1852. *Christiania*, 1854, 8vo. pamphlet.—BY THE SAME.

Syphilistimen studeret ved Sygesengen af W. Boeck. *Christiania*, 1854, 8vo.—BY THE SAME.

Das Chemische Laboratorium des Universitet Christiania und die darin Ausgeföhrten Chemischen Untersuchungen. Herausgegeben von A. Strecker. *Christiania*, 1854, 4to. pamphlet.—BY THE SAME.

Norsk og Keltisk, Om det norske og de Keltiske Sprogs Indbyrdes Loan af C. A. Holmbœ. *Christiania*, 1854, 4to.—BY THE SAME.

Symbol ad ad Historiam Antiquorem Rerum Norvegiarum, Edidit P. A. Murch. *Christiania*, 1850, 4to.—BY THE SAME.

Reizen en on der sockingen in Sumatra gedran op last der Nederlandsche Indische Regering, Tusschen de jaren en 1833-34, door Dr. S. Muller en Dr. L. Horner. *Sgravenhage*, 1855, 8vo.—BY THE AUTHORS.

Natvirkundig Tijdschrift voor Nederlandsche Indië, Deel VIII. aflevering V. und VI. und deel III.—IV.—BY THE NATURAL HISTORY SOCIETY OF NETHERLAND'S INDIA.

Bijdragen tot de Taal-Land-en Volkenkunde von Neerlandsch Indië. Derde deel, 1855.—BY THE ROYAL INSTITUTE OF HISTORY, GEOGRAPHY AND ETHNOLOGY OF NETHERLAND'S INDIA.

Anniversary Address to the Geographical Society of London, by W. J. Hamilton, Esq. for 1853. London, 1855.—BY THE GEOGRAPHICAL SOCIETY.

Journal of the Geographical Society, Vol. XXIV.—BY THE SAME.

Annual Report of the Grant Medical College, Bombay, for the session 1854-55.—BY THE COLLEGE.

The Calcutta Christian Observer for Sept. 1855.—BY THE EDITORS.

The Oriental Baptist, No. 105.—BY THE EDITOR.

The Upadeshak, No. 105.—BY THE EDITOR.

The Oriental Christian Spectator, August, 1855.—BY THE EDITOR.

The Tattwabodhiní Patriká, No. 146.—BY THE TATTWABODHINI' SOBHA'.

The Durbin for September 1855.—BY THE EDITOR.

The Citizen Newspaper for Sept. 1855.—BY THE EDITOR.

The Central Star, Vol. III. No. 29.—BY THE EDITOR.

The Indian Times, Vol. I. No. 5.—BY THE EDITOR.

Exchanged.

The Athenæum, for June, 1855.

The Philosophical Magazine, for July, 1855.

Purchased.

- Annales des Sciences Naturelles, Tome III. No. 2.
 Revue et Magazin de Zoologie, No. 5, for 1855.
 The American Journal of Science and Arts, Nos. 55 and 57.
 Revue des Deux Mondes, June, 1855.
 The Annals and Magazine of Natural History, No. 91.
 The Quarterly Review, No. CXCIII.
 The Edinburgh Review, No. 207.
 L'Athenæum Français, Nos. 2, 3, 4, 5, 7, 8, 9, 14, 24, 25, 26 and 27.
 Bulletin Archéologique, Nos. 2, 3 and 6.
 The Literary Gazette, 2004 @ 8.
 Journal des Savants, Juin, 1855.
 Comptes Rendus, No. 24, 25, 26 and I.

RA'JENDRALA'L MITTRA.

Oct. 1st, 1855.

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FOR NOVEMBER, 1855.

- The Society met on the 7th Inst. at the usual hour.  
 Sir J. W. Colvile, Kt. President, in the chair.  
 The proceedings of the last month were read and confirmed.  
 Presentations were received—  
 1. From W. Theobald, Esq., facsimile of an inscription from Rangoon.  
 2. From H. Cope, Esq., facsimile of an inscription found in an excavation lately made at Kangra, under the superintendence of Capt. Walker, 7th N. I. and presented by him to Lt. Dunbar, of the 6th M. N. I.  
 3. From the Govt. of Bombay through Lt. E. F. Fergusson, Supt. Govt. Observatory, copy of the meteorological observations made at the Observatory in 1852.  
 4. From Capt. Dicy 1st Asst. Master Attendant, a stone Image of Sivapárvatí, and 2 silver and 2 gold coins found near the Light House at Saugor.
- The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members.
- P. W. Legeyt, Esq. Bombay, C. S.  
 J. Middleton, Esq. (re-elected.)

The Chairman announced to the meeting that the Council have appointed Bábu Rájendralál Mittra, to officiate as Secretary pending the election of a Secretary.

Communications were received—

1. From the Govt. of the N. W. Provinces through Mr. Asst. Secy. W. Carmichael, forwarding copy of a meteorological register kept at the Office of the Secy. to the Govt. at Agra, for the month of Sept. 1855.

2. From Bábu Rádhánáth Sikdár, enclosing abstracts of the results of the hourly meteorological observations taken at the Surveyor General's Office, in the month of July, 1855.

3. From A. Grote, Esq. enclosing a letter from Dr. Hunter, to Col. Hannay, on a collection of clays, &c., from Debrughur, Upper Assam.

The following is Dr. Hunter's report on the specimens.

No. 1. Brilliant white kaolin or porcelain earth of first rate quality, suited to the manufacture of porcelain, chemical, and table wares.

No. 2. Fresh compact white felspar, the Petunse of China, used in the bodies and glazes of porcelain and pottery.

No. 3. Fossil wood of coal measures, makes good table weights when polished (silicious.)

No. 4. White fossil wood of coal measures impregnated with Alumina (a rare kind of fossil wood.)

No. 5. Indianite, a mineral intermediate between quartz and felspar, contains a good deal of lime or potass and melts into a *pure* white enamel.

No. 6. Shell limestone or blue mountain limestone of the coal formations containing fossil wood.

No. 7. Compact limestone with crystals of calcareous spar and transverse septae.

This is a fragment of a gigantic Ammonite.

No. 8. Tuffaceous lime, portion of a gigantic Ammonites catena (see plate 42 Fig 3, of Buckland's Geology.)

No. 9. Tuffaceous lime and clay slate containing impressions of shells and of an *Ammonite*.

No. 10. This is a very fine specimen of nepheline, a rare mineral belonging to the felspar family.

- No. 11. Granular Indianite containing chlorite, useful in the bodies of stone ware.
- No. 12. Yellow ochron marl from coal measures, Jeypore.
- No. 13. Blue shale from the coal measures, Jeypore.
- No. 14. Yellow sandy ochre from the coal measures, Jeypore.
- No. 15. White soft aluminous kaolin, from the vicinity of Golaghat. This with No. 1, and No. 2, ought to make first rate porcelain.
- No. 16. Red ochre from the Naga hills useful for coloring glazes and painting pottery or porcelain.
- No. 17. Tough black clay from the river bank Golaghat, useful for pottery, roofing and paving tiles, requires to be mixed with 2 parts of slaty clay or shale No. 13.
- No. 18. White ball clay useful for fire-bricks, seggars and stoneware.
- No. 19. Tough blue clay, useful for stoneware and for seggars with equal parts of No. 18.
- No. 20. Yellow sandy clay too coarse except for brick-making, to be used with tough brown clay or No. 21.
- No. 21. Tough black clay useful for bricks and tiles.
- No. 22. Potter's clay unwashed. This is like Stourbridge fire clay, used for seggars, fire-bricks, stoneware and chemical ware.
- No. 23. Fine silt used for making bath bricks.
- No. 24. Yellow silt used for bath bricks for sharpening knives.
- No. 25. Grey silt from the bed of a tank (a very sandy clay of little use.)
- No. 26. Red ochre (washed) used for coloring pottery.
- No. 27. Slaty clay or shale used for bricks along with No. 22, or No. 18.
- No. 28. Tough blue clay from the coal measures, Jeypore, used for pottery and making artificial hydraulic cement.
- No. 29. Quartz and felspar pebbles from the hot springs near Golaghat.
- No. 30. Fossil wood and bones or horns converted into yellow ochre.
- No. 31. Soft aluminous shale or Polier slate used for polishing and burnishing metals.

No. 32. Red marl used for coloring dips and glazes.

No. 33. Yellow clay makes bright red earthenware.

No. 34. This is not selenite but agalmatolite, the figure-stone of the Chinese. The selenite ought to be sought for in the vicinity of salt springs.

The sample of soapstone is of the finest and whitest description, it is like the fine French chalk used for scouring woollen cloth. Of the above samples Nos. 17—21, and 23, would work well together, 18, or 22, would work well with 27 and 28, with 31. You cannot use the kaolin yet, till you get mills to grind the felspar and quartz to a creamy consistency.

4. From E. Thomas, Esq. submitting a paper on the Coins of the Gupta dynasty.

5. From B. H. Hodgson, Esq. enclosing vocabularies of the Toda, Kotá, Badaga, Kurumba and Irula tongues.

6. From Lt. R. Stewart, North Cachar, forwarding "Notes on Northern Cachar, with appendices, on the natives of the country and their languages.

7. From W. Theobold, Esq. submitting a paper on Indian oology. The Librarian submitted his usual monthly report.

Capt. Thuillier, at the request of the chairman, read to the Meeting extracts from a private letter from M. Adolphe Schlagintweit, giving an account of his travels beyond the Kumaon range.

#### LIBRARY.

The Library has received the following accessions since the last month, viz.  
*Presented.*

Madras exhibition of 1855 : Catalogue Raisonné of the thirty classes into which the articles in the exhibition are divided, with an Index of the subjects comprised in each class and of the names of exhibitors ; compiled for the use of the Jurors, by Lieut. H. P. Hawkes, *Madras*, 1855, fl. fol.—**BY THE GOVT. OF BENGAL.**

Official and descriptive Catalogue of the Madras exhibition of 1855, 4to.—**BY THE SAME.**

Ossetische Sprachlehre nebst einer Abhandlung über das Mingrelische, Suanische und Abchasiache, von Dr. Georg Rosen, 4to. Pamphlet.—**BY THE AUTHOR.**

Catalogue of Stars near the Ecliptic observed at Markree, vol. III, *Dublin*, 1854. 8vo.—**BY THE ROYAL SOCIETY OF LONDON.**

Philosophical Transactions of the Royal Society of London, vol. CXLIV.  
Parts I.—II.—BY THE SAME.

Transactions of the Royal Society of Edinburgh vol. XXI, Parts I.—II.—  
BY THE SOCIETY.

Proceedings of the Royal Society of Edinburgh, Session 1853-4, No. 54-5.  
—BY THE SAME.

Selections from the Records of Government, North Western Provinces,  
Part XXI.—BY THE GOVT.

Selections from the Public Correspondence of the Punjab Administration,  
No. XII. 4 copies.—BY THE CHIEF COMMISSIONER OF LAHORE.

The Mollusca, or the Classes, Families and Genera of Recent and Fossil  
Shells, by Edward Balfour.—BY THE AUTHOR.

The Upadeshak, No. 107.—BY THE EDITOR.

The Oriental Baptist, No. 107.—BY THE EDITOR.

The Oriental Christian Spectator, No. 9.—BY THE EDITOR.

The Calcutta Christian Observer, for Oct. and Nov. 1855.—BY THE  
EDITORS.

The Durbín, a Persian newspaper, for Oct. 1855.—BY THE EDITOR.

Selections from the Records of the Goverment of India, No. VIII. Report  
on the Metalliferous Deposits of Kumaon and Ghurwal.—BY THE GOVT. OF  
INDIA.

Dictionnaire Français, Arabe, Persan et Ture, par le Prince Alexandre  
Handpère, Vol. I. *Mocon*, 1840, 4to.—BY —?

The Indian Annals of Medieval Science, No. V.—BY THE EDITOR.

Magnetical and Meteorological Observations made at the Hon'ble East India  
Company's Observatory at Bombay, in the year 1852, under the superintend-  
ence of Lieut. Fergusson.—BY THE GOVT. OF BOMBAY.

*Purchased.*

Revue de Deux Mondes, 1-15, Juillet et Aout.

Mohammed der Prophet, sein Leben und seine Lehre. Aus handschriftlichen  
quellen und dem Koran gechöpft und dargestellt von Dr. G. Weil. *Stutt-  
gart*, 1843, post 8vo.

The North American Review, No. 146.

The American Journal of Science and Arts, No. 58.

The Annals and Magazine of Natural History, No. 92.

The Literary Gazette, Nos. 2009 to 12.

L'Athenæum Français, Nos. 28 to 31.

Bulletin Archæologique, No. 7.

Revue et Magazin de Zoologie, No. 6, for 1855.

Annales des Sciences Naturelles, Tome III, No. 3.

Description des Animaux Fossiles du groupe Nummulitique de l'Inde par le Vicounte d'Archiac. Part II. 4to.

L'Empire Chinois, faisant suite a l'ouvrage intitulé Souvenirs d'un Voyage dans la Tartarie et le Thibet, par M. Huc. Deuxieme edition. Paris, 1854, 2 vols. 8vo.

A Gazetteer of the Territories under the Government of the East India Company and of the Native States on the Continent of India. By E. Thornton. London, 1854, 4 vols. 8vo.

Egypt's Place in Universal History, by Bunsen, vol. II.

Bunsen's Philosophy of Universal History, 2 vols. 8vo.

Journal des Savants Vol. for 1838 and for Juillet, 1855.

Comptes Rendus, Nos. 2 to 5.

*Exchanged.*

Calcutta Review for Sept. 1855.

The Athenaeum for July, 1855.

The Philosophical Magazine, No. 64.

Nov. 7th, 1855.

RA'JENDRALA'L MITTRA.

FOR DECEMBER, 1855.

At the usual monthly general Meeting of the Society held on the 5th instant.

Sir J. W. Colvile Kt. President, in the chair.

Presentations were received—

1. From R. P. Harrison, Esq. through A. Grote, Esq. 3 bronze figures. "They were found," says Mr. H. "by a native about five miles from the station (Cuttack,) when digging for the foundation of a new house. There is an inscription at the back of one of the figures which appears to be in Sanscrit. I could find no one here who could read it. The figures are not those of any deities usually worshipped in this part of the country. They do not seem to be very ancient, but as Samuels told me the Society might like to have them, I forward them herewith." \*

Bábu Rájendralál Mittra stated that the figures were Buddhist, and between seven and eight hundred years old, and submitted the following transcript and translation of the inscription.

खसि श्रीयथाति नगरान्तस्थितौ श्रीगौडचन्द्र देवस्य विजयराघवः सम्बत् ५५  
अय आप्तिः कमद्वैष्टकमुखावस्थिता यं नयन्ति श्वानः तले सेवका चयत्कावरणम् ॥

*Translation.*

Prosperity. In the samvat 55 of the victorious king, Sri Gaudchandra Deva, during his stay in the suburbs of Yayatinagara. On the top are kamandi (query, kámáṅga, the excitors of lust?) who are supported by the dogs at the root of the tree; (around) the base are worshippers; three are attendants."

2. From Baron Von Hammer-Purgstall, the 6th vol. of his History of Arabic Literature.

3. From Bábu Sivaprasád, through Principal Isvarachandra Vidyáságár, the 1st vol. of his Bhugol Hastámalak, a treatise on Geography in Hindi.

4. From Principal Isvarachandra Vidyáságár, his 1st and 2nd Pamphlets in Bengali, on the marriage of Hindu Widows.

The following gentlemen were named for ballot at the next ordinary Meeting.

R. H. Russell, Esq. B. C. S. Chittagong, proposed by F. Beaufort, Esq. and seconded by Capt. Thuillier.

Dr. von Leibig, Professor at the Presidency College, proposed by Mr. Grote, and seconded by Sir J. Colvile.

Col. Smith, proposed by Mr. Allen, and seconded by Mr. Grote.

J. W. B. Money, Esq. B. C. S. proposed by Sir J. Colvile, and seconded by Mr. Atkinson.

The chairman announced that Dr. Boycott having resigned, the Council had elected, subject to the confirmation of the Society, Mr. W. S. Atkinson, as member of their body and honorary Secretary to the Society.

He also stated, in behalf of the Council, that the situation of House Serjeant to the Society having become vacant by the death of Serjeant MacGrath, they had appointed a Jemadar on Rs. 12 and an additional Chowkedar, on Rs. 6 per mensem, to perform his duties. The arrangement was approved and sanctioned.

Capt. Thuillier gave notice of his intention, at the next annual general meeting, to propose to alter and amend so much of Rule 8, as prescribed a quarterly payment of 16 Rs. subscription for all members of the Society and to substitute a lower rate.

Communications were received—

1. From Mr. Under-Secy. Morris, communicating copy of a letter from the Govt. to the Magistrate of Bhágalpur, directing him to keep the Jammá masjid clear of jungle.

The letter is as follows :—

No. 647.

From the Under-Secy. to the Govt. of Bengal,

To the Magistrate of Bhágalpur.

Dated Fort William, the 3rd November, 1855.

SIR,

GENERAL.

I am directed by the Lieutenant-Governor to furnish you with a copy of the correspondence noted

From Managing Director and Agent of the East India Railway Company. Dated 27th April, 1855, and one enclosure.

To do, do. No. 931, do. 9th May.

To the Railway Commrs. No. 932 @ do.

From ditto ditto, No. 106, do. 28th May.

To the Secy. Asiatic Society, No. 1230. Dated the 7th June.

To ditto ditto, No. 1871, do. 11th Sept.

From ditto ditto, dated 22nd Oct.

in the margin, and to request that you will take measures to keep the Masjid at Rájmehal therein referred to, free from jungle, so that it may be easy of access to antiquarians or other visitors.

For this purpose you are authorized to incur such moderate annual expense as may be necessary, submitting to this office previously an estimate for approval. It is understood that the building is now free from jungle, having been recently cleared by the Railway Company's Officers, but you will ascertain how this really is.

2. You are requested to report whose property the Masjid now is.

Yours, &c.

(Signed) G. G. MORRIS,

*Under Secy. Govt. of Bengal.*

2. From the Govt. N. W. P. through Mr. Asst. Secy. W. Carmichael, forwarding copy of a meteorological register kept at the office of the Secy. to the Govt. of the N. W. P. at Agra for the month of October last.

3. From the Government of Bengal, through Mr. Under-Secy. Morris, forwarding a report on the Economic Geology of Upper Assam with two boxes of specimens.

Extracts from the report were read.

The Librarian submitted his usual monthly report.

#### L I B R A R Y.

The following additions have been made to the Library since the last Meeting.

#### *Presented.*

Sitzungsbericht der kaiserlichen Academie der Wissenschaften, Mathematisch-Naturwissenschaftlich classe. Band XII, heft V. Band XIII, heft 1-2, and Index to Band X.—**BY THE ACADEMY.**

Ditto Philosophisch-Historische Classe, Band XII, heft V. Band XIII, heft 1-2.—**BY THE SAME.**

Monumenta Habsburgica, 1er Band.—**BY THE SAME.**

Archiv fur Kunde österreichischer Geschichtsquellen, Band XIII, 1-2, heft.—**BY THE SAME.**

Notizenblatt, Beilage sum Archiv fur Kunde österreichischer Geschichtsquellen, Nos. 18 and 24.—**BY THE SAME.**

Bhugol Hastámalak, or an Epitome of Geography in Hindi. By Bábu Sivaprasád, *Calcutta*, 1855, 8vo.—**BY THE AUTHOR.**

On the Marriage of Hindu Widows, 2 Pamphlets, by Principal Isvrachandra Vidyáságara.—**BY THE AUTHOR.**

Natuurkundig Tijdschrift voor Nederlandsch Indie, Deal IX, Nos. V.—VI.—**BY THE EDITORS.**

The Durbín, a Persian newspaper, for Nov. 1855.—**BY THE EDITOR.**

The Tattwabodhini Patriká for Nov.—**BY THE TATTWABODHINI SABHA'.**

The Citizen newspaper, for Nov. 1855.—**BY THE EDITOR.**

The Oriental Christian Spectator for Oct. 1855.—**BY THE EDITOR.**

#### *Purchased.*

The English in Western India, being the Early History of the Factory at Surat of Bombay, and the subordinate factories on the Western coast, by P. Anderson, *Bombay*, 1854, 8vo.

Indische Gedichte in deutschen Nachbildwhen over Albert Haefer. *Leipzig* 1844, 2 vols. 12mo.

Revue des Deux Mondes, tome IX, and X, 1, 2, 4, Livraisons.

Comptes Rendus, Nos. 6 to 10.

L'Athenæum Française 9 Nos.

#### *Exchanged.*

The Athenæum, for Aug. 1855.

RA'JENDRALA'L MITTRA.

Dec. 1st, 1855.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of August, 1854.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Daily Means, &c. of the observations and of the hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 320 Fath. | Range of the Barometer<br>during the day. |         |         | Mean Bulb<br>Thermometer. | Range of the Temper-<br>ature during<br>the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|---------------------------|--------------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                           | Max.                                             | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | °                         | °                                                | °    | °     |
| 1     | 29.357                                          | 29.414                                    | 29.284  | .0130   | 83.4                      | 88.0                                             | 80.9 | 7.1   |
| 2     | .381                                            | .449                                      | .335    | .114    | 81.9                      | 86.0                                             | 80.0 | 6.0   |
| 3     | .471                                            | .536                                      | .427    | .109    | 82.7                      | 87.8                                             | 79.1 | 8.7   |
| 4     | .521                                            | .575                                      | .475    | .100    | 84.2                      | 88.0                                             | 81.6 | 6.4   |
| 5     | .565                                            | .627                                      | .516    | .111    | 83.1                      | 86.1                                             | 80.1 | 6.0   |
| 6     | Sunday.                                         |                                           |         |         |                           |                                                  |      |       |
| 7     | .547                                            | .612                                      | .472    | .140    | 85.6                      | 90.6                                             | 81.7 | 8.9   |
| 8     | .493                                            | .546                                      | .429    | .117    | 84.9                      | 86.8                                             | 83.6 | 3.2   |
| 9     | .494                                            | .551                                      | .444    | .107    | 82.5                      | 84.2                                             | 80.6 | 3.6   |
| 10    | .523                                            | .574                                      | .478    | .096    | 81.1                      | 82.9                                             | 79.2 | 3.7   |
| 11    | .533                                            | .601                                      | .465    | .136    | 82.1                      | 86.6                                             | 79.6 | 7.0   |
| 12    | .510                                            | .553                                      | .447    | .106    | 82.4                      | 86.2                                             | 79.5 | 6.7   |
| 13    | Sunday.                                         |                                           |         |         |                           |                                                  |      |       |
| 14    | .555                                            | .625                                      | .502    | .123    | 84.2                      | 89.6                                             | 81.2 | 8.4   |
| 15    | .644                                            | .697                                      | .599    | .098    | 83.5                      | 86.2                                             | 81.6 | 4.6   |
| 16    | .673                                            | .746                                      | .616    | .130    | 83.1                      | 86.6                                             | 81.2 | 5.4   |
| 17    | .688                                            | .734                                      | .638    | .096    | 81.1                      | 83.8                                             | 79.2 | 4.6   |
| 18    | .687                                            | .747                                      | .632    | .115    | 81.9                      | 85.6                                             | 79.4 | 6.2   |
| 19    | .668                                            | .721                                      | .611    | .110    | 79.7                      | 82.0                                             | 78.0 | 4.0   |
| 20    | Sunday.                                         |                                           |         |         |                           |                                                  |      |       |
| 21    | .692                                            | .755                                      | .619    | .136    | 84.6                      | 89.8                                             | 81.0 | 8.8   |
| 22    | .647                                            | .692                                      | .579    | .113    | 84.2                      | 86.6                                             | 82.5 | 4.1   |
| 23    | .643                                            | .692                                      | .593    | .099    | 83.7                      | 86.8                                             | 81.6 | 5.2   |
| 24    | .633                                            | .693                                      | .577    | .116    | 83.4                      | 87.6                                             | 80.0 | 7.6   |
| 25    | .648                                            | .710                                      | .596    | .114    | 84.2                      | 88.5                                             | 80.2 | 8.3   |
| 26    | .677                                            | .734                                      | .616    | .118    | 83.2                      | 87.2                                             | 79.0 | 8.2   |
| 27    | Sunday.                                         |                                           |         |         |                           |                                                  |      |       |
| 28    | .595                                            | .641                                      | .515    | .126    | 84.4                      | 92.0                                             | 81.4 | 10.6  |
| 29    | .587                                            | .637                                      | .539    | .098    | 83.8                      | 90.8                                             | 80.6 | 10.2  |
| 30    | .601                                            | .651                                      | .537    | .114    | 83.9                      | 88.6                                             | 80.6 | 8.0   |
| 31    | .577                                            | .642                                      | .506    | .136    | 84.2                      | 88.0                                             | 80.8 | 7.2   |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of August, 1854.*

Daily Means, &c. of the observations and of the hygrometrical elements  
dependent thereon. (*Continued.*)

| Date. | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a cubic foot of air. | Additional weight of Vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|-------|----------------------------|---------------------|--------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
| 1     | 80.2                       | 3.2                 | 78.6               | 4.8                       | .958                          | 10.28                                         | 1.68                                                          | 0.860                                                     |
| 2     | 80.0                       | 1.9                 | 79.0               | 2.9                       | .970                          | .44                                           | .00                                                           | .913                                                      |
| 3     | 80.5                       | 2.2                 | 79.4               | 3.3                       | .983                          | .56                                           | .16                                                           | .901                                                      |
| 4     | 80.9                       | 3.3                 | 79.2               | 5.0                       | .976                          | .45                                           | .79                                                           | .854                                                      |
| 5     | 80.8                       | 2.3                 | 79.6               | 3.5                       | .989                          | .60                                           | .26                                                           | .894                                                      |
| 6     | Sunday.                    |                     |                    |                           |                               |                                               |                                                               |                                                           |
| 7     | 82.6                       | 3.0                 | 81.1               | 4.5                       | 1.037                         | 11.06                                         | .70                                                           | .867                                                      |
| 8     | 82.7                       | 2.2                 | 81.6               | 3.3                       | .053                          | .27                                           | .22                                                           | .902                                                      |
| 9     | 81.3                       | 1.2                 | 80.7               | 1.8                       | .024                          | .00                                           | 0.64                                                          | .945                                                      |
| 10    | 79.9                       | 1.2                 | 79.3               | 1.8                       | 0.979                         | 10.55                                         | .62                                                           | .944                                                      |
| 11    | 80.2                       | 1.9                 | 79.2               | 2.9                       | .976                          | .50                                           | 1.01                                                          | .912                                                      |
| 12    | 80.7                       | 1.7                 | 79.8               | 2.6                       | .995                          | .69                                           | 0.92                                                          | .921                                                      |
| 13    | Sunday.                    |                     |                    |                           |                               |                                               |                                                               |                                                           |
| 14    | 81.8                       | 2.4                 | 80.6               | 3.6                       | 1.021                         | .92                                           | 1.32                                                          | .892                                                      |
| 15    | 81.4                       | 2.1                 | 80.3               | 3.2                       | .011                          | .84                                           | .16                                                           | .903                                                      |
| 16    | 81.1                       | 2.0                 | 80.1               | 3.0                       | .005                          | .77                                           | .09                                                           | .908                                                      |
| 17    | 80.1                       | 1.0                 | 79.6               | 1.5                       | 0.989                         | .65                                           | 0.52                                                          | .953                                                      |
| 18    | 80.4                       | 1.5                 | 79.6               | 2.3                       | .989                          | .65                                           | .79                                                           | .931                                                      |
| 19    | 78.5                       | 1.2                 | 77.9               | 1.8                       | .937                          | .12                                           | .60                                                           | .944                                                      |
| 20    | Sunday.                    |                     |                    |                           |                               |                                               |                                                               |                                                           |
| 21    | 81.7                       | 2.9                 | 80.2               | 4.4                       | 1.008                         | .79                                           | 1.60                                                          | .871                                                      |
| 22    | 82.1                       | 2.1                 | 81.0               | 3.2                       | .034                          | 11.07                                         | .17                                                           | .904                                                      |
| 23    | 81.5                       | 2.2                 | 80.4               | 3.3                       | .014                          | 10.87                                         | .20                                                           | .901                                                      |
| 24    | 80.8                       | 2.6                 | 79.5               | 3.9                       | 0.986                         | .57                                           | .39                                                           | .884                                                      |
| 25    | 81.8                       | 2.8                 | 80.0               | 4.2                       | 1.001                         | .72                                           | .52                                                           | .876                                                      |
| 26    | 81.2                       | 2.0                 | 80.2               | 3.0                       | .008                          | .81                                           | .08                                                           | .909                                                      |
| 27    | Sunday.                    |                     |                    |                           |                               |                                               |                                                               |                                                           |
| 28    | 81.9                       | 2.5                 | 80.6               | 3.8                       | .021                          | .92                                           | .39                                                           | .887                                                      |
| 29    | 81.5                       | 2.3                 | 80.3               | 3.5                       | .011                          | .82                                           | .28                                                           | .894                                                      |
| 30    | 81.7                       | 2.2                 | 80.6               | 3.3                       | .021                          | .94                                           | .19                                                           | .902                                                      |
| 31    | 81.7                       | 2.5                 | 80.4               | 3.8                       | .014                          | .85                                           | .39                                                           | .886                                                      |

*Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1854.*

Hourly Means, &c. of the observations and of the hygrometrical elements dependent thereon. (*Continued.*)

| Hour.      | Mean Height of the Barometer at 32° Fahr. | Range of the Barometer for each hour during the month. |         |         | Mean Dry Bulb Thermometer. | Range of the Temperature for each hour during the month. |      |       |
|------------|-------------------------------------------|--------------------------------------------------------|---------|---------|----------------------------|----------------------------------------------------------|------|-------|
|            |                                           | Max.                                                   | Min.    | Diff.   |                            | Max.                                                     | Min. | Diff. |
|            | Inches.                                   | Inches.                                                | Inches. | Inches. | °                          | °                                                        | °    | °     |
| Mid-night. | 29.592                                    | 29.727                                                 | 29.377  | .350    | 81.9                       | 84.4                                                     | 79.8 | 4.6   |
| 1          | .575                                      | .709                                                   | .364    | .345    | 81.8                       | 84.6                                                     | 79.8 | 4.8   |
| 2          | .561                                      | .696                                                   | .347    | .349    | 81.6                       | 84.6                                                     | 79.6 | 5.0   |
| 3          | .552                                      | .688                                                   | .346    | .342    | 81.5                       | 84.4                                                     | 79.6 | 4.8   |
| 4          | .550                                      | .688                                                   | .349    | .339    | 81.4                       | 84.2                                                     | 79.2 | 5.0   |
| 5          | .563                                      | .704                                                   | .350    | .354    | 80.9                       | 82.5                                                     | 78.7 | 3.8   |
| 6          | .573                                      | .705                                                   | .361    | .344    | 80.9                       | 83.6                                                     | 78.4 | 5.2   |
| 7          | .593                                      | .738                                                   | .387    | .351    | 81.4                       | 83.6                                                     | 78.7 | 4.9   |
| 8          | .610                                      | .735                                                   | .383    | .352    | 82.6                       | 84.8                                                     | 79.4 | 5.4   |
| 9          | .624                                      | .742                                                   | .387    | .355    | 83.7                       | 86.6                                                     | 79.4 | 7.2   |
| 10         | .629                                      | .755                                                   | .378    | .377    | 84.9                       | 89.2                                                     | 79.2 | 10.0  |
| 11         | .620                                      | .742                                                   | .373    | .369    | 85.3                       | 90.1                                                     | 79.8 | 10.3  |
|            |                                           |                                                        |         |         |                            |                                                          |      |       |
| Noon.      | .601                                      | .714                                                   | .352    | .362    | 86.2                       | 91.0                                                     | 80.6 | 10.4  |
| 1          | .581                                      | .691                                                   | .333    | .358    | 86.4                       | 92.0                                                     | 80.6 | 11.4  |
| 2          | .558                                      | .691                                                   | .311    | .380    | 86.0                       | 91.2                                                     | 79.6 | 11.6  |
| 3          | .538                                      | .682                                                   | .290    | .392    | 85.4                       | 88.4                                                     | 79.2 | 9.2   |
| 4          | .524                                      | .645                                                   | .284    | .361    | 85.1                       | 89.2                                                     | 79.2 | 10.0  |
| 5          | .526                                      | .645                                                   | .296    | .349    | 84.4                       | 87.8                                                     | 79.6 | 8.2   |
| 6          | .537                                      | .652                                                   | .309    | .343    | 83.7                       | 86.6                                                     | 79.5 | 7.1   |
| 7          | .553                                      | .663                                                   | .338    | .325    | 83.0                       | 85.8                                                     | 79.0 | 6.8   |
| 8          | .579                                      | .686                                                   | .339    | .347    | 82.7                       | 85.0                                                     | 79.0 | 6.0   |
| 9          | .602                                      | .716                                                   | .393    | .323    | 82.3                       | 85.3                                                     | 78.5 | 6.8   |
| 10         | .615                                      | .731                                                   | .394    | .337    | 82.1                       | 85.2                                                     | 78.0 | 7.2   |
| 11         | .613                                      | .726                                                   | .387    | .339    | 81.9                       | 84.6                                                     | 78.4 | 6.2   |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of August, 1854.*

Hourly Means, &c. of the observations and of the hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a cubic foot of air. | Additional weight of Vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|------------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
|            | o                          | o                   | o                   | o                         | Inches.                       | T. gr.                                        | T. gr.                                                        |                                                           |
| Mid-night. | 80.5                       | 1.4                 | 79.8                | 2.1                       | 0.995                         | 10.71                                         | 0.73                                                          | 0.936                                                     |
| 1          | 80.4                       | 1.4                 | 79.7                | 2.1                       | .992                          | .68                                           | .72                                                           | .937                                                      |
| 2          | 80.4                       | 1.2                 | 79.8                | 1.8                       | .995                          | .71                                           | .63                                                           | .944                                                      |
| 3          | 80.3                       | 1.2                 | 79.7                | 1.8                       | .992                          | .68                                           | .63                                                           | .944                                                      |
| 4          | 80.1                       | 1.3                 | 79.4                | 2.0                       | .983                          | .58                                           | .69                                                           | .939                                                      |
| 5          | 79.7                       | 1.2                 | 79.1                | 1.8                       | .973                          | .49                                           | .61                                                           | .945                                                      |
| 6          | 79.8                       | 1.1                 | 79.2                | 1.7                       | .976                          | .52                                           | .58                                                           | .948                                                      |
| 7          | 80.2                       | 1.2                 | 79.6                | 1.8                       | .989                          | .65                                           | .62                                                           | .945                                                      |
| 8          | 80.7                       | 1.9                 | 79.7                | 2.9                       | .992                          | .66                                           | 1.02                                                          | .913                                                      |
| 9          | 81.2                       | 2.5                 | 79.9                | 3.8                       | .998                          | .69                                           | .38                                                           | .886                                                      |
| 10         | 81.8                       | 3.1                 | 80.2                | 4.7                       | 1.008                         | .77                                           | .72                                                           | .862                                                      |
| 11         | 81.9                       | 3.4                 | 80.2                | 5.1                       | .008                          | .77                                           | .87                                                           | .852                                                      |
|            |                            |                     |                     |                           |                               |                                               |                                                               |                                                           |
| Noon.      | 82.6                       | 3.6                 | 80.8                | 5.4                       | .027                          | .96                                           | 2.03                                                          | .844                                                      |
| 1          | 82.4                       | 4.0                 | 80.4                | 6.0                       | .014                          | .81                                           | .25                                                           | .828                                                      |
| 2          | 82.4                       | 3.6                 | 80.6                | 5.4                       | .021                          | .90                                           | .01                                                           | .844                                                      |
| 3          | 82.0                       | 3.4                 | 80.3                | 5.1                       | .011                          | .80                                           | 1.88                                                          | .852                                                      |
| 4          | 81.9                       | 3.2                 | 80.3                | 4.8                       | .011                          | .80                                           | .77                                                           | .859                                                      |
| 5          | 81.7                       | 2.7                 | 80.3                | 4.1                       | .011                          | .82                                           | .49                                                           | .879                                                      |
| 6          | 81.5                       | 2.2                 | 80.4                | 3.3                       | .014                          | .87                                           | .20                                                           | .901                                                      |
| 7          | 81.1                       | 1.9                 | 80.1                | 2.9                       | .005                          | .77                                           | .05                                                           | .911                                                      |
| 8          | 80.9                       | 1.8                 | 80.0                | 2.7                       | .001                          | .75                                           | 0.97                                                          | .917                                                      |
| 9          | 80.7                       | 1.6                 | 79.9                | 2.4                       | 0.998                         | .74                                           | .84                                                           | .927                                                      |
| 10         | 80.4                       | 1.7                 | 79.5                | 2.6                       | .986                          | .60                                           | .91                                                           | .921                                                      |
| 11         | 80.4                       | 1.5                 | 79.6                | 2.3                       | .989                          | .65                                           | .79                                                           | .931                                                      |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of August, 1854.*

Solar radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain. | Prevailing direction of the Wind.        | General aspect of the Sky.                                                                                              |
|-------|-----------------------|-------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 1     | o                     | Inc.  | E. or N. E. or E. N.<br>E. blowing sharp | Cloudy with occasional drizzling.                                                                                       |
|       | ..                    | 1.16  | whole day.                               |                                                                                                                         |
| 2     | ..                    | 0.33  | N. E. occasionally sharp or E.           | Cloudy with constant drizzling.                                                                                         |
| 3     | ..                    | 0.71  | E. or S. E.                              | Cloudy and constantly raining or drizzling.                                                                             |
| 4     | 115.0                 | 0.16  | S. E. or S.                              | Cloudy with rain between 8 and 9 P. M. and                                                                              |
| 5     | ..                    | 0.34  | S. E. or S.                              | Cloudy. [occasional drizzling.                                                                                          |
| 6     | <i>Sunday.</i>        |       |                                          |                                                                                                                         |
| 7     | 127.4                 | ..    | S.                                       | Cloudy.                                                                                                                 |
| 8     | ..                    | ..    | S. or S. W.                              | Ditto.                                                                                                                  |
| 9     | ..                    | 0.88  | S. or S. E. or S. W.                     | Cloudy with constant rain.                                                                                              |
| 10    | ..                    | 0.86  | S.                                       | Ditto.                                                                                                                  |
| 11    | ..                    | ..    | S. W. or W.                              | Cloudy with constant drizzling.                                                                                         |
| 12    | ..                    | 0.48  | S. or S. W.                              | Ditto.                                                                                                                  |
| 13    | <i>Sunday.</i>        |       |                                          |                                                                                                                         |
| 14    | 124.0                 | ..    | W. or S. W. or S.                        | Cloudy with rain between 8 and 9 P. M.                                                                                  |
| 15    | ..                    | 1.04  | S.                                       | Cloudy with rain between 1 and 2 P. M. and                                                                              |
| 16    | ..                    | ..    | S. or S. E.                              | Cloudy. [occasionally drizzling.                                                                                        |
| 17    | ..                    | 1.66  | S. E. or S. or S. W.                     | Cloudy and occasionally raining or drizzling.                                                                           |
| 18    | ..                    | ..    | Calm or S. W. or S.                      | Cloudy and drizzling at 4 P. M.                                                                                         |
| 19    | ..                    | 1.18  | S. S. E. or S. S. W.                     | Cloudy with constant rain or drizzling.                                                                                 |
| 20    | <i>Sunday.</i>        |       |                                          |                                                                                                                         |
| 21    | 148.0                 | ..    | S. or S. W.                              | Cloudless till 6 A. M. cloudy afterwards with a shower of rain between 6 and 7 P. M. and a little drizzling afterwards. |
| 22    | ..                    | 0.60  | S. blowing high at 8 and 10 P. M.        | Cloudy. [between 1 and 2 P. M.                                                                                          |
| 23    | ..                    | 0.26  | S. E. or S.                              | Cloudy with drizzling and a shower of rain                                                                              |
| 24    | 110.0                 | ..    | S.                                       | Cloudy and raining at 4 P. M. and drizzling                                                                             |
| 25    | 130.0                 | ..    | S. or S. W. or S. E.                     | Cloudy. [now and then,                                                                                                  |
| 26    | ..                    | 0.15  | S. or S. W. (high at 10 P. M.)           | Cloudy with a shower of rain between 2 and 3 A. M. and occasional drizzling.                                            |
| 27    | <i>Sunday.</i>        |       |                                          |                                                                                                                         |
| 28    | 145.0                 | 0.66  | Calm or S. W. or S. E.                   | Cloudy and a shower of rain between 2 and 3 P. M. and a little drizzling afterwards.                                    |
| 29    | 130.0                 | 0.12  | S. or S. W.                              | Cloudy and raining or drizzling between 5 and 7 P. M.                                                                   |
| 30    | 135.0                 | 0.82  | Calm or N. E. or S. E.                   | Cloudless till 4 P. M. cloudy afterwards and raining at 4 P. M.                                                         |
| 31    | 130.2                 | 0.18  | S.                                       | Cloudless till 3 A. M. cloudy with a shower of rain between Noon and 1 P. M.                                            |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of September, 1854.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

Daily Means, &c. of the observations and of the hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at $32^{\circ}$ Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempe-<br>rature during<br>the day. |      |       |
|-------|----------------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|--------------------------------------------------|------|-------|
|       |                                                          | Max.                                      | Min.    | Diff.   |                               | Max.                                             | Min. | Diff. |
|       | Inches.                                                  | Inches.                                   | Inches. | Inches. | °                             | °                                                | °    | °     |
| 1     | 29.587                                                   | 29.634                                    | 29.518  | 0.116   | 84.2                          | 89.4                                             | 81.0 | 8.4   |
| 2     | .625                                                     | .688                                      | .565    | .123    | 83.6                          | 88.2                                             | 80.4 | 7.8   |
| 3     | Sunday.                                                  |                                           |         |         |                               |                                                  |      |       |
| 4     | .665                                                     | .740                                      | .589    | .151    | 84.0                          | 89.9                                             | 80.4 | 9.5   |
| 5     | .633                                                     | .700                                      | .572    | .128    | 84.4                          | 88.9                                             | 81.0 | 7.9   |
| 6     | .611                                                     | .672                                      | .480    | .192    | 83.9                          | 90.0                                             | 81.6 | 8.4   |
| 7     | .588                                                     | .653                                      | .505    | .148    | 83.3                          | 89.8                                             | 80.2 | 9.6   |
| 8     | .550                                                     | .600                                      | .486    | .114    | 83.9                          | 90.2                                             | 80.0 | 10.2  |
| 9     | .558                                                     | .613                                      | .507    | .106    | 82.8                          | 86.2                                             | 80.0 | 6.2   |
| 10    | Sunday.                                                  |                                           |         |         |                               |                                                  |      |       |
| 11    | .597                                                     | .645                                      | .545    | .100    | 82.8                          | 87.9                                             | 80.7 | 7.2   |
| 12    | .594                                                     | .649                                      | .531    | .118    | 80.5                          | 83.8                                             | 79.2 | 4.6   |
| 13    | .526                                                     | .588                                      | .463    | .125    | 80.3                          | 83.6                                             | 77.4 | 6.2   |
| 14    | .539                                                     | .597                                      | .490    | .107    | 83.5                          | 86.6                                             | 80.2 | 6.4   |
| 15    | .589                                                     | .655                                      | .533    | .122    | 83.2                          | 86.0                                             | 81.2 | 4.8   |
| 16    | .588                                                     | .642                                      | .542    | .100    | 83.8                          | 88.4                                             | 79.8 | 8.6   |
| 17    | Sunday.                                                  |                                           |         |         |                               |                                                  |      |       |
| 18    | .659                                                     | .710                                      | .592    | .118    | 83.5                          | 88.7                                             | 78.5 | 10.2  |
| 19    | .660                                                     | .708                                      | .581    | .127    | 83.6                          | 90.6                                             | 78.8 | 11.8  |
| 20    | .666                                                     | .718                                      | .594    | .124    | 85.4                          | 91.0                                             | 80.8 | 10.2  |
| 21    | .696                                                     | .761                                      | .636    | .125    | 81.5                          | 86.4                                             | 78.3 | 8.1   |
| 22    | .730                                                     | .783                                      | .677    | .106    | 80.7                          | 84.0                                             | 78.2 | 5.8   |
| 23    | .699                                                     | .755                                      | .622    | .133    | 81.4                          | 87.0                                             | 78.4 | 8.6   |
| 24    | Sunday.                                                  |                                           |         |         |                               |                                                  |      |       |
| 25    | .716                                                     | .759                                      | .659    | .100    | 78.0                          | 79.7                                             | 76.0 | 3.7   |
| 26    | .796                                                     | .853                                      | .739    | .114    | 79.9                          | 84.6                                             | 76.8 | 7.8   |
| 27    | .820                                                     | .882                                      | .757    | .125    | 82.0                          | 86.6                                             | 77.8 | 8.8   |
| 28    | .804                                                     | .877                                      | .724    | .153    | 82.3                          | 86.9                                             | 78.0 | 8.9   |
| 29    | .746                                                     | .812                                      | .658    | .154    | 84.2                          | 89.8                                             | 79.6 | 10.2  |
| 30    | .723                                                     | .777                                      | .656    | .121    | 83.0                          | 88.2                                             | 80.9 | 7.3   |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of September, 1854.*

Daily Means, &c. of the observations and of the hygrometrical elements  
dependent thereon. (*Continued.*)

| Date | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a cubic foot of air. | Additional weight of Vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
| 1    | 81.7                       | 2.5                 | 80.4                | 3.8                       | 1.014                         | 10.85                                         | 1.39                                                          | .886                                                      |
| 2    | 81.4                       | 2.2                 | 80.3                | 3.3                       | .011                          | .84                                           | .19                                                           | .901                                                      |
| 3    | <i>Sunday.</i>             |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 4    | 81.5                       | 2.5                 | 80.2                | 3.8                       | .008                          | .79                                           | .38                                                           | .887                                                      |
| 5    | 82.0                       | 2.4                 | 80.8                | 3.6                       | .027                          | .98                                           | .33                                                           | .892                                                      |
| 6    | 81.4                       | 2.5                 | 80.1                | 3.8                       | .005                          | .75                                           | .38                                                           | .886                                                      |
| 7    | 80.5                       | 2.8                 | 79.1                | 4.2                       | 0.973                         | .45                                           | .48                                                           | .876                                                      |
| 8    | 80.3                       | 3.6                 | 78.5                | 5.4                       | .955                          | .25                                           | .88                                                           | .845                                                      |
| 9    | 80.3                       | 2.5                 | 79.0                | 3.8                       | .970                          | .42                                           | .33                                                           | .887                                                      |
| 10   | <i>Sunday.</i>             |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 11   | 79.9                       | 2.9                 | 78.4                | 4.4                       | .952                          | .23                                           | .52                                                           | .871                                                      |
| 12   | 78.8                       | 1.7                 | 77.9                | 2.6                       | .937                          | .10                                           | 0.88                                                          | .920                                                      |
| 13   | 79.1                       | 1.2                 | 78.5                | 1.8                       | .955                          | .31                                           | .60                                                           | .945                                                      |
| 14   | 81.6                       | 1.9                 | 80.6                | 2.9                       | 1.021                         | .94                                           | 1.06                                                          | .912                                                      |
| 15   | 81.6                       | 1.6                 | 80.8                | 2.4                       | .027                          | 11.03                                         | 0.86                                                          | .928                                                      |
| 16   | 81.0                       | 2.8                 | 79.6                | 4.2                       | 0.989                         | 10.60                                         | 1.50                                                          | .876                                                      |
| 17   | <i>Sunday.</i>             |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 18   | 80.2                       | 3.3                 | 78.5                | 5.0                       | .955                          | .25                                           | .75                                                           | .854                                                      |
| 19   | 80.4                       | 3.2                 | 78.8                | 4.8                       | .964                          | .34                                           | .69                                                           | .860                                                      |
| 20   | 81.7                       | 3.7                 | 79.8                | 5.6                       | .995                          | .62                                           | 2.06                                                          | .838                                                      |
| 21   | 79.9                       | 1.6                 | 79.1                | 2.4                       | .973                          | .49                                           | 0.82                                                          | .927                                                      |
| 22   | 78.4                       | 2.3                 | 77.2                | 3.5                       | .916                          | 9.87                                          | 1.17                                                          | .894                                                      |
| 23   | 77.8                       | 3.6                 | 76.0                | 5.4                       | .882                          | .50                                           | .77                                                           | .843                                                      |
| 24   | <i>Sunday.</i>             |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 25   | 76.8                       | 1.2                 | 76.2                | 1.8                       | .887                          | .62                                           | 0.57                                                          | .944                                                      |
| 26   | 77.7                       | 2.2                 | 76.6                | 3.3                       | .899                          | .71                                           | 1.07                                                          | .901                                                      |
| 27   | 79.5                       | 2.5                 | 78.2                | 3.8                       | .946                          | 10.17                                         | .30                                                           | .887                                                      |
| 28   | 79.7                       | 2.6                 | 78.4                | 3.9                       | .952                          | .23                                           | .35                                                           | .883                                                      |
| 29   | 81.2                       | 3.0                 | 79.7                | 4.5                       | .992                          | .61                                           | .63                                                           | .867                                                      |
| 30   | 81.1                       | 1.9                 | 80.1                | 2.9                       | 1.005                         | .77                                           | .05                                                           | .911                                                      |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta in  
the month of September, 1854.*

Hourly Means, &c. of the observations and of the hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Height of the Barometer at 32° Fahr. | Range of the Barometer for each hour during the Month. |         |         | Mean Dry Bulb Thermometer. | Range of the Temperature for each hour during the month. |      |       |  |
|------------|-------------------------------------------|--------------------------------------------------------|---------|---------|----------------------------|----------------------------------------------------------|------|-------|--|
|            |                                           | Max.                                                   | Min.    | Diff.   |                            | Max.                                                     | Min. | Diff. |  |
|            |                                           |                                                        |         |         |                            |                                                          |      |       |  |
|            | Inches.                                   | Inches.                                                | Inches. | Inches. | °                          | °                                                        | °    | °     |  |
| Mid-night. | 29.673                                    | 29.829                                                 | 29.561  | 0.268   | 80.9                       | 84.0                                                     | 77.4 | 6.6   |  |
| 1          | .664                                      | .825                                                   | .543    | .282    | 80.8                       | 83.6                                                     | 77.8 | 5.8   |  |
| 2          | .650                                      | .818                                                   | .533    | .285    | 80.5                       | 83.2                                                     | 77.7 | 5.5   |  |
| 3          | .641                                      | .812                                                   | .530    | .282    | 80.3                       | 83.0                                                     | 77.5 | 5.5   |  |
| 4          | .633                                      | .808                                                   | .498    | .310    | 80.1                       | 83.0                                                     | 77.0 | 6.0   |  |
| 5          | .641                                      | .813                                                   | .503    | .310    | 79.8                       | 82.8                                                     | 76.0 | 6.8   |  |
| 6          | .655                                      | .823                                                   | .512    | .311    | 79.8                       | 82.6                                                     | 76.5 | 6.1   |  |
| 7          | .674                                      | .853                                                   | .542    | .311    | 80.2                       | 82.6                                                     | 76.9 | 5.7   |  |
| 8          | .696                                      | .870                                                   | .565    | .305    | 81.7                       | 84.8                                                     | 76.4 | 8.4   |  |
| 9          | .704                                      | .877                                                   | .569    | .308    | 83.0                       | 85.8                                                     | 77.8 | 8.0   |  |
| 10         | .705                                      | .882                                                   | .569    | .313    | 84.0                       | 87.2                                                     | 77.5 | 9.7   |  |
| 11         | .694                                      | .862                                                   | .557    | .305    | 85.4                       | 89.2                                                     | 78.6 | 10.6  |  |
| Noon.      | .670                                      | .839                                                   | .531    | .308    | 85.9                       | 89.8                                                     | 79.7 | 10.1  |  |
| 1          | .647                                      | .819                                                   | .486    | .333    | 86.0                       | 90.1                                                     | 79.2 | 10.9  |  |
| 2          | .623                                      | .800                                                   | .470    | .330    | 86.3                       | 90.9                                                     | 78.2 | 12.7  |  |
| 3          | .604                                      | .777                                                   | .472    | .305    | 85.5                       | 91.0                                                     | 78.2 | 12.8  |  |
| 4          | .591                                      | .762                                                   | .463    | .299    | 84.9                       | 89.6                                                     | 78.6 | 11.0  |  |
| 5          | .597                                      | .781                                                   | .472    | .309    | 84.3                       | 88.4                                                     | 78.4 | 10.0  |  |
| 6          | .611                                      | .784                                                   | .481    | .303    | 83.3                       | 87.2                                                     | 77.8 | 9.4   |  |
| 7          | .625                                      | .811                                                   | .479    | .332    | 82.8                       | 86.5                                                     | 77.8 | 8.7   |  |
| 8          | .648                                      | .836                                                   | .503    | .333    | 82.3                       | 86.0                                                     | 77.6 | 8.4   |  |
| 9          | .672                                      | .853                                                   | .516    | .337    | 82.1                       | 85.2                                                     | 77.8 | 7.4   |  |
| 10         | .681                                      | .858                                                   | .540    | .318    | 81.7                       | 85.0                                                     | 77.6 | 7.4   |  |
| 11         | .679                                      | .846                                                   | .550    | .296    | 81.4                       | 85.0                                                     | 77.7 | 7.3   |  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of September, 1854.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Wet Bulb Thermometer. |     | Dry Bulb above Wet. | Computed Dew Point. |       | Dry Point. | Bulb above Dew Point. | Elastic force of Vapour. | Mean Weight of Vapour in a Cubic foot of Air. | Additional Weight of Vapour required for complete saturation. | Tgr. | Tgr.  | Mean degree of Humidity complete saturation being unity. |
|------------|----------------------------|-----|---------------------|---------------------|-------|------------|-----------------------|--------------------------|-----------------------------------------------|---------------------------------------------------------------|------|-------|----------------------------------------------------------|
|            | o                          | o   |                     | o                   | o     |            |                       |                          |                                               |                                                               |      |       |                                                          |
| Mid-night. | 79.6                       | 1.3 | 78.9                | 2.0                 | 0.967 | 10.43      |                       |                          |                                               |                                                               | 0.67 | 0.940 |                                                          |
|            | 79.5                       | 1.3 | 78.8                | 2.0                 | .964  | .40        |                       |                          |                                               |                                                               | .67  | .939  |                                                          |
|            | 79.3                       | 1.2 | 78.7                | 1.8                 | .961  | .37        |                       |                          |                                               |                                                               | .61  | .944  |                                                          |
|            | 79.1                       | 1.2 | 78.5                | 1.8                 | .955  | .31        |                       |                          |                                               |                                                               | .60  | .945  |                                                          |
|            | 79.1                       | 1.0 | 78.6                | 1.5                 | .958  | .34        |                       |                          |                                               |                                                               | .50  | .954  |                                                          |
|            | 78.8                       | 1.0 | 78.3                | 1.5                 | .949  | .24        |                       |                          |                                               |                                                               | .51  | .953  |                                                          |
|            | 78.8                       | 1.0 | 78.3                | 1.5                 | .949  | .24        |                       |                          |                                               |                                                               | .51  | .953  |                                                          |
|            | 79.0                       | 1.2 | 78.4                | 1.8                 | .952  | .27        |                       |                          |                                               |                                                               | .61  | .944  |                                                          |
|            | 79.9                       | 1.8 | 79.0                | 2.7                 | .970  | .44        |                       |                          |                                               |                                                               | .93  | .918  |                                                          |
|            | 80.3                       | 2.7 | 78.9                | 4.1                 | .967  | .39        |                       |                          |                                               |                                                               | 1.43 | .879  |                                                          |
|            | 80.7                       | 3.3 | 79.0                | 5.0                 | .970  | .40        |                       |                          |                                               |                                                               | .77  | .855  |                                                          |
|            | 81.3                       | 4.1 | 79.2                | 6.2                 | .976  | .43        |                       |                          |                                               |                                                               | 2.25 | .823  |                                                          |
| Noon.      | 81.4                       | 4.5 | 79.1                | 6.8                 | .973  | .38        |                       |                          |                                               |                                                               | .49  | .807  |                                                          |
|            | 81.6                       | 4.4 | 79.4                | 6.6                 | .983  | .47        |                       |                          |                                               |                                                               | .44  | .811  |                                                          |
|            | 81.7                       | 4.6 | 79.4                | 6.9                 | .983  | .47        |                       |                          |                                               |                                                               | .55  | .804  |                                                          |
|            | 81.2                       | 4.3 | 79.0                | 6.5                 | .970  | .35        |                       |                          |                                               |                                                               | .37  | .814  |                                                          |
|            | 81.3                       | 3.6 | 79.5                | 5.4                 | .986  | .55        |                       |                          |                                               |                                                               | 1.94 | .845* |                                                          |
|            | 81.1                       | 3.2 | 79.5                | 4.8                 | .986  | .55        |                       |                          |                                               |                                                               | .73  | .859  |                                                          |
|            | 80.6                       | 2.7 | 79.2                | 4.1                 | .976  | .48        |                       |                          |                                               |                                                               | .45  | .878  |                                                          |
|            | 80.2                       | 2.6 | 78.9                | 3.9                 | .967  | .39        |                       |                          |                                               |                                                               | .36  | .884  |                                                          |
|            | 80.2                       | 2.1 | 79.1                | 3.2                 | .973  | .47        |                       |                          |                                               |                                                               | .11  | .904  |                                                          |
|            | 80.1                       | 2.0 | 79.1                | 3.0                 | .973  | .47        |                       |                          |                                               |                                                               | .04  | .910  |                                                          |
|            | 80.0                       | 1.7 | 79.1                | 2.6                 | .973  | .47        |                       |                          |                                               |                                                               | 0.90 | .921  |                                                          |
|            | 79.8                       | 1.6 | 79.0                | 2.4                 | .970  | .46        |                       |                          |                                               |                                                               | .81  | .928  |                                                          |

*Meteorological Observations.*

*Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1854.*

Solar radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain. | Pervailing direction of the Wind.         | General Aspect of the sky.                                                                  |
|-------|-----------------------|-------|-------------------------------------------|---------------------------------------------------------------------------------------------|
| 1     | 128.0                 | 0.10  | S. E. or E. or S.                         | More or less cloudy till 9 P. M. with a shower of rain at 1 P. M. cloudless after 9 P. M.   |
| 2     | 114.0                 | 0.36  | S. E. or S.                               | Cloudless till 6 A. M. more or less cloudy afterwards with a little rain at 2 P. M.         |
| 3     | <i>Sunday.</i>        |       |                                           |                                                                                             |
| 4     | 130.0                 | ..    | S. E. or S.                               | More or less cloudy the whole day.                                                          |
| 5     | 134.0                 | ..    | S. or S. E.                               | Scattered clouds.                                                                           |
| 6     | 146.0                 | 0.59  | S. E. or N. E.                            | More or less cloudy with a smart shower of rain at 4 P. M.                                  |
| 7     | ..                    | ..    | E.                                        | More or less cloudy with little rain at 11 A. M.                                            |
| 8     | 126.0                 | 0.20  | S. E. or N. E. or S. S. E.                | Cloudy.                                                                                     |
| 9     | 126.0                 | 0.29  | N. E. (high at 3 A. M.) or N. N. E. or E. | Cloudy with rain at 11 A. M.                                                                |
| 10    | <i>Sunday.</i>        |       |                                           |                                                                                             |
| 11    | 135.0                 | 0.38  | N. E. or E. constantly blowing sharp.     | Cloudy and occasionally raining.                                                            |
| 12    | ..                    | 0.26  | E. or S. E.                               | Ditto ditto ditto.                                                                          |
| 13    | ..                    | 1.57  | S. E.                                     | Ditto ditto ditto.                                                                          |
| 14    | ..                    | ..    | S. or S. E. or S. S. E.                   | Cloudy.                                                                                     |
| 15    | ..                    | ..    | S. E. or S.                               | Cloudy and drizzling at 10 P. M.                                                            |
| 16    | 144.2                 | ..    | S. or S. W.                               | Scattered clouds and cloudless between 8 P. M. and midnight.                                |
| 17    | <i>Sunday.</i>        |       |                                           |                                                                                             |
| 18    | 125.0                 | ..    | W. S. W.                                  | Cloudy or scattered clouds.                                                                 |
| 19    | 136.0                 | ..    | S. or S. W. or W. or N.                   | Ditto ditto.                                                                                |
| 20    | 140.0                 | ..    | S. or occasionally calm or N. E.          | Cloudless till 5 A. M. Scattered clouds afterwards.                                         |
| 21    | ..                    | 1.58  | N. E. or N. W. or W. or calm.             | Clear between midnight and 4 A. M. cloudy afterwards and occasionally raining or drizzling. |
| 22    | ..                    | ..    | Calm or E. occasionally sharp.            | Cloudy from midnight till 7 P. M. and clear afterwards, also drizzling at 1 P. M.           |
| 23    | 135.0                 | ..    | E. or N. E.                               | Cloudy the whole day and occasionally drizzling.                                            |
| 24    | <i>Sunday.</i>        |       |                                           |                                                                                             |
| 25    | ..                    | 1.28  | E. blowing high to whole day.             | Cloudy the whole day and constantly raining or drizzling.                                   |
| 26    | ..                    | 0.88  | E. always high or S. E.                   | Cloudy the whole day and raining at 8 A. M.                                                 |
| 27    | 134.0                 | ..    | E.                                        | More or less cloudy the whole day.                                                          |
| 28    | 124.0                 | ..    | S.                                        | Cloudless till 4 A. M. and scattered $\cap$ or $\backslash$ afterwards.                     |
| 29    | 141.0                 | ..    | S.                                        | Cloudless till 3 A. M. Scattered $\cap$ till 6 P. M. cloudless afterwards.                  |
| 30    | ..                    | ..    | S.                                        | Cloudless till 3 A. M. cloudy afterwards.                                                   |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in  
the month of October, 1854.*

Latitude 22° 33' 1" North, Longitude 88° 20' 34" East.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of the Barometer at 32° Fahr. | Range of the Barometer during the day. |         |         | Mean Dry Bulb Thermometer. | Range of the Temperature during the day. |      |       |
|-------|-------------------------------------------|----------------------------------------|---------|---------|----------------------------|------------------------------------------|------|-------|
|       |                                           | Max.                                   | Min.    | Diff.   |                            | Max.                                     | Min. | Diff. |
| 1     | Inches.                                   | Inches.                                | Inches. | Inches. | °                          | °                                        | °    | °     |
| 2     | Sunday.                                   | 29.751                                 | 29.807  | .056    | 82.4                       | 86.0                                     | 80.6 | 5.4   |
| 3     |                                           | .757                                   | .817    | .66     | 82.8                       | 89.8                                     | 79.2 | 10.6  |
| 4     |                                           | .774                                   | .840    | .666    | 83.2                       | 90.0                                     | 79.4 | 10.6  |
| 5     |                                           | .807                                   | .885    | .818    | 83.9                       | 90.6                                     | 79.4 | 11.2  |
| 6     |                                           | .783                                   | .851    | .668    | 85.1                       | 90.0                                     | 80.4 | 9.6   |
| 7     |                                           | .748                                   | .825    | .677    | 83.5                       | 89.6                                     | 80.2 | 9.4   |
| 8     | Sunday.                                   |                                        |         |         |                            |                                          |      |       |
| 9     |                                           | .881                                   | .898    | .017    | 85.2                       | 91.0                                     | 80.4 | 10.6  |
| 10    |                                           | .857                                   | .940    | .883    | 80.2                       | 82.8                                     | 77.4 | 5.4   |
| 11    |                                           | .780                                   | .861    | .681    | 80.7                       | 84.0                                     | 78.4 | 5.6   |
| 12    |                                           | .766                                   | .822    | .656    | 80.1                       | 84.0                                     | 78.6 | 5.4   |
| 13    |                                           | .840                                   | .913    | .673    | 80.2                       | 87.2                                     | 77.8 | 9.4   |
| 14    |                                           | .898                                   | .954    | .656    | 82.3                       | 89.0                                     | 77.9 | 11.1  |
| 15    | Sunday.                                   |                                        |         |         |                            |                                          |      |       |
| 16    |                                           | .896                                   | .964    | .668    | 80.2                       | 87.6                                     | 74.0 | 13.6  |
| 17    |                                           | .885                                   | .961    | .676    | 79.1                       | 86.4                                     | 73.3 | 13.1  |
| 18    |                                           | .860                                   | .938    | .678    | 77.5                       | 84.6                                     | 71.9 | 12.7  |
| 19    |                                           | .837                                   | .915    | .678    | 77.6                       | 85.0                                     | 70.8 | 14.2  |
| 20    |                                           | .861                                   | .909    | .658    | 79.2                       | 85.4                                     | 74.1 | 11.3  |
| 21    |                                           | .887                                   | .945    | .658    | 80.8                       | 87.0                                     | 73.5 | 13.5  |
| 22    | Sunday.                                   |                                        |         |         |                            |                                          |      |       |
| 23    |                                           | .877                                   | .928    | .651    | 77.9                       | 83.8                                     | 75.8 | 8.0   |
| 24    |                                           | .903                                   | .971    | .668    | 77.4                       | 82.4                                     | 75.4 | 7.0   |
| 25    |                                           | .896                                   | .955    | .659    | 78.5                       | 83.4                                     | 75.7 | 7.7   |
| 26    |                                           | .861                                   | .939    | .679    | 80.1                       | 85.4                                     | 75.8 | 9.6   |
| 27    |                                           | .880                                   | .936    | .656    | 79.0                       | 83.8                                     | 75.8 | 8.0   |
| 28    |                                           | .946                                   | .997    | .651    | 78.3                       | 85.6                                     | 74.9 | 10.7  |
| 29    | Sunday.                                   |                                        |         |         |                            |                                          |      |       |
| 30    |                                           | .976                                   | 30.045  | .921    | .125                       | 80.4                                     | 85.8 | 76.2  |
| 31    |                                           | .975                                   | .052    | .919    | .133                       | 80.3                                     | 86.2 | 74.8  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in  
the month of October, 1854.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Date. | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a Cubic foot of Air. | Additional weight of vapour required for complete saturation. | Mean degree of Humidity complete saturation being unity. |
|-------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------|
|       | °                          | °                   | °                   | °                         | Inches.                       | T. gr.                                        | T. gr.                                                        |                                                          |
| 1     | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 2     | 80.4                       | 2.0                 | 79.4                | 3.0                       | .983                          | 10.56                                         | 1.05                                                          | 0.910                                                    |
| 3     | 80.2                       | 2.6                 | 78.9                | 3.9                       | .967                          | .39                                           | .36                                                           | .884                                                     |
| 4     | 80.3                       | 2.9                 | 78.8                | 4.4                       | .964                          | .36                                           | .53                                                           | .871                                                     |
| 5     | 80.5                       | 3.4                 | 78.8                | 5.1                       | .964                          | .34                                           | .79                                                           | .852                                                     |
| 6     | 81.6                       | 3.5                 | 79.8                | 5.3                       | .995                          | .64                                           | .93                                                           | .846                                                     |
| 7     | 80.8                       | 2.7                 | 79.4                | 4.1                       | .983                          | .54                                           | .46                                                           | .878                                                     |
| 8     | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 9     | 81.6                       | 3.6                 | 79.8                | 5.4                       | .995                          | .64                                           | .97                                                           | .844                                                     |
| 10    | 78.9                       | 1.3                 | 78.2                | 2.0                       | .946                          | .21                                           | 0.67                                                          | .938                                                     |
| 11    | 79.1                       | 1.6                 | 78.3                | 2.4                       | .949                          | .24                                           | .80                                                           | .928                                                     |
| 12    | 78.8                       | 1.3                 | 78.1                | 2.0                       | .943                          | .18                                           | .66                                                           | .939                                                     |
| 13    | 78.2                       | 2.0                 | 77.2                | 3.0                       | .916                          | 9.89                                          | .99                                                           | .909                                                     |
| 14    | 78.9                       | 3.4                 | 77.2                | 5.1                       | .916                          | .85                                           | 1.73                                                          | .851                                                     |
| 15    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 16    | 74.6                       | 5.6                 | 71.8                | 8.4                       | .771                          | 8.31                                          | 2.57                                                          | .764                                                     |
| 17    | 73.2                       | 5.9                 | 70.2                | 8.9                       | .732                          | 7.91                                          | .62                                                           | .751                                                     |
| 18    | 71.8                       | 5.7                 | 68.9                | 8.6                       | .701                          | .60                                           | .44                                                           | .757                                                     |
| 19    | 73.1                       | 4.5                 | 70.8                | 6.8                       | .746                          | 8.09                                          | 1.98                                                          | .803                                                     |
| 20    | 75.3                       | 3.9                 | 73.3                | 5.9                       | .809                          | .73                                           | .83                                                           | .827                                                     |
| 21    | 76.6                       | 4.2                 | 74.5                | 6.3                       | .840                          | 9.07                                          | 2.00                                                          | .819                                                     |
| 22    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 23    | 76.1                       | 1.8                 | 75.2                | 2.7                       | .860                          | .31                                           | 0.85                                                          | .916                                                     |
| 24    | 75.7                       | 1.7                 | 74.8                | 2.6                       | .849                          | .20                                           | .81                                                           | .919                                                     |
| 25    | 76.6                       | 1.9                 | 75.6                | 2.9                       | .871                          | .42                                           | .93                                                           | .910                                                     |
| 26    | 77.8                       | 2.3                 | 76.6                | 3.5                       | .899                          | .69                                           | 1.15                                                          | .894                                                     |
| 27    | 77.0                       | 2.0                 | 76.0                | 3.0                       | .882                          | .54                                           | 0.96                                                          | .909                                                     |
| 28    | 76.0                       | 2.3                 | 74.8                | 3.5                       | .849                          | .19                                           | 1.09                                                          | .894                                                     |
| 29    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 30    | 75.6                       | 4.8                 | 73.2                | 7.2                       | .806                          | 8.70                                          | 2.24                                                          | .795                                                     |
| 31    | 76.2                       | 4.1                 | 74.1                | 6.2                       | .830                          | .96                                           | 1.95                                                          | .821                                                     |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in  
the month of October, 1854.*

Hourly Means, &c of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.      | Mean Height of the Barometer at 32° Fahr. | Range of the Barometer for each hour during the month. |         |         | Mean Dry Bulb Thermometer. | Range of the Temperature for each hour during the month. |      |       |
|------------|-------------------------------------------|--------------------------------------------------------|---------|---------|----------------------------|----------------------------------------------------------|------|-------|
|            |                                           | Max.                                                   | Min.    | Diff.   |                            | Max.                                                     | Min. | Diff. |
|            | Inches.                                   | Inches.                                                | Inches. | Inches. | °                          | °                                                        | °    | °     |
| Mid-night. | 29.853                                    | 29.983                                                 | 29.742  | 0.241   | 78.3                       | 83.2                                                     | 73.3 | 9.9   |
| 1          | .844                                      | .968                                                   | .733    | .235    | 78.0                       | 82.7                                                     | 72.8 | 9.9   |
| 2          | .834                                      | .959                                                   | .721    | .238    | 77.8                       | 82.6                                                     | 72.3 | 10.3  |
| 3          | .827                                      | .960                                                   | .718    | .242    | 77.7                       | 82.4                                                     | 72.0 | 10.4  |
| 4          | .829                                      | .962                                                   | .715    | .247    | 77.3                       | 82.5                                                     | 71.5 | 11.0  |
| 5          | .838                                      | .973                                                   | .722    | .251    | 77.3                       | 82.6                                                     | 71.3 | 11.3  |
| 6          | .856                                      | 30.005                                                 | .744    | .261    | 77.0                       | 81.8                                                     | 70.8 | 11.0  |
| 7          | .887                                      | .025                                                   | .760    | .265    | 77.6                       | 82.2                                                     | 72.5 | 9.7   |
| 8          | .901                                      | .049                                                   | .793    | .256    | 80.0                       | 84.7                                                     | 76.0 | 8.7   |
| 9          | .913                                      | .052                                                   | .807    | .245    | 81.6                       | 86.3                                                     | 78.2 | 8.1   |
| 10         | .913                                      | .047                                                   | .800    | .247    | 82.9                       | 87.4                                                     | 76.8 | 10.6  |
| 11         | .894                                      | .026                                                   | .786    | .240    | 84.2                       | 88.9                                                     | 79.9 | 9.0   |
|            |                                           |                                                        |         |         |                            |                                                          |      |       |
| Noon.      | .869                                      | 29.992                                                 | .757    | .235    | 85.3                       | 90.4                                                     | 82.4 | 8.0   |
| 1          | .839                                      | .955                                                   | .738    | .217    | 85.2                       | 91.0                                                     | 77.8 | 13.2  |
| 2          | .815                                      | .934                                                   | .706    | .228    | 85.5                       | 90.6                                                     | 78.8 | 11.8  |
| 3          | .800                                      | .921                                                   | .678    | .243    | 85.0                       | 91.0                                                     | 77.1 | 13.9  |
| 4          | .798                                      | .925                                                   | .671    | .254    | 84.0                       | 90.0                                                     | 77.2 | 12.8  |
| 5          | .803                                      | .931                                                   | .692    | .239    | 82.4                       | 89.4                                                     | 76.8 | 12.6  |
| 6          | .815                                      | .952                                                   | .692    | .260    | 80.9                       | 87.2                                                     | 76.3 | 10.9  |
| 7          | .836                                      | .969                                                   | .706    | .263    | 80.1                       | 86.3                                                     | 76.2 | 10.1  |
| 8          | .858                                      | .997                                                   | .727    | .270    | 79.6                       | 85.6                                                     | 76.2 | 9.4   |
| 9          | .871                                      | 30.001                                                 | .747    | .254    | 79.2                       | 85.1                                                     | 75.0 | 10.1  |
| 10         | .875                                      | 29.996                                                 | .759    | .237    | 78.9                       | 84.6                                                     | 74.7 | 9.9   |
| 11         | .870                                      | .988                                                   | .752    | .236    | 78.6                       | 84.0                                                     | 74.7 | 9.3   |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in  
the Month of October, 1854.*

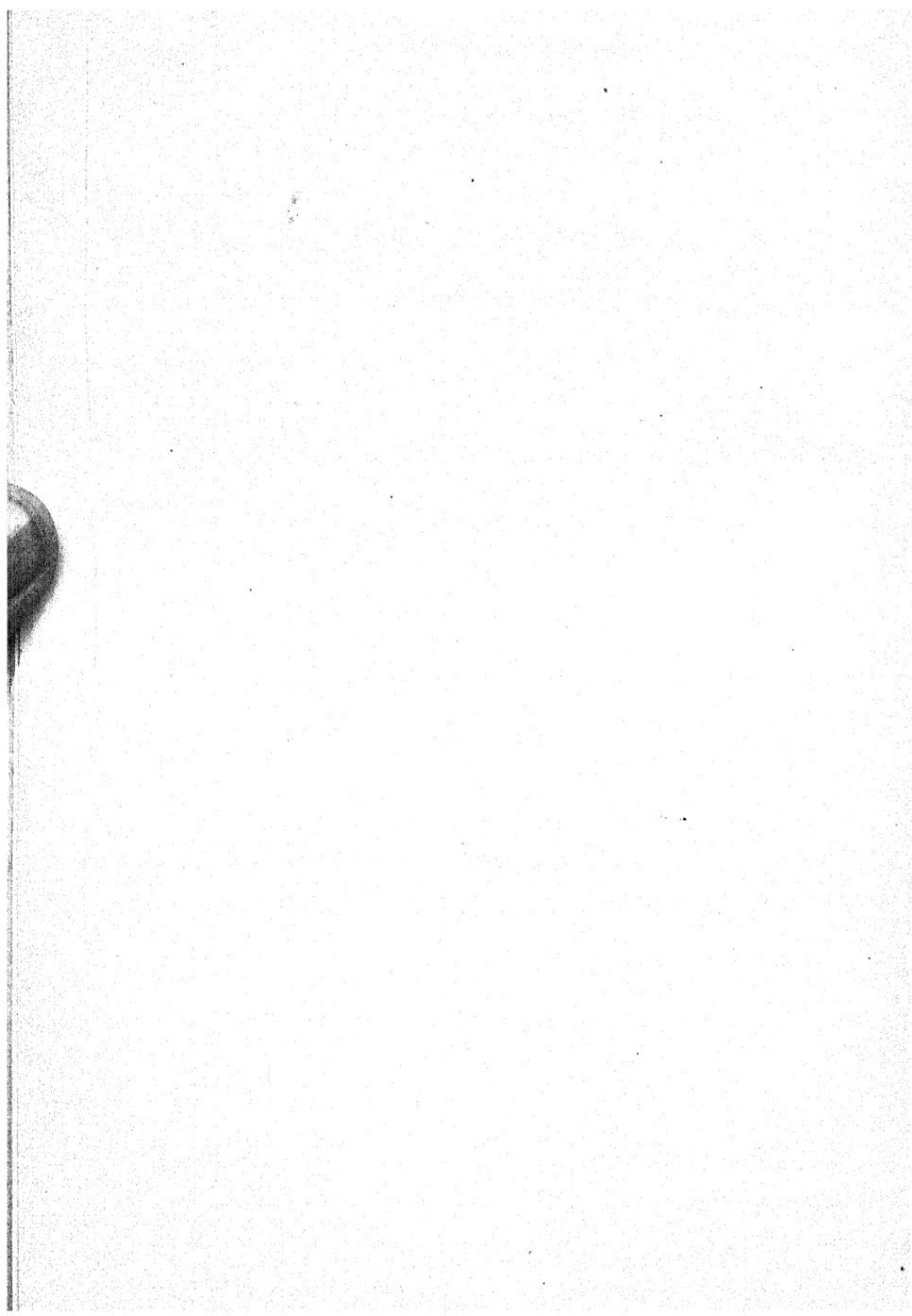
Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Wet Bulb Thermometer. |     | Dry Bulb above Wet. |     | Computed Dew Point. |                  | Inches. | T. gr. | T. gr. | Mean Weight of Vapour in a Cubic foot of Air. | Additional weight of vapour required for complete saturation. | Mean degree of Humidity complete saturation being unity. |
|------------|----------------------------|-----|---------------------|-----|---------------------|------------------|---------|--------|--------|-----------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------|
|            | o                          | o   | o                   | o   | Dry Point.          | Above Dew Point. |         |        |        |                                               |                                                               |                                                          |
| Mid-night. | 76.8                       | 1.5 | 76.0                | 2.3 | 0.882               | 9.56             | 0.72    | 0.930  |        |                                               |                                                               |                                                          |
|            | 76.6                       | 1.4 | 75.9                | 2.1 | .879                | .53              | .66     | .935   |        |                                               |                                                               |                                                          |
|            | 76.4                       | 1.4 | 75.7                | 2.1 | .873                | .47              | .66     | .935   |        |                                               |                                                               |                                                          |
|            | 76.5                       | 1.2 | 75.9                | 1.8 | .879                | .53              | .57     | .944   |        |                                               |                                                               |                                                          |
|            | 75.1                       | 1.2 | 75.5                | 1.8 | .868                | .42              | .56     | .944   |        |                                               |                                                               |                                                          |
|            | 76.2                       | 1.1 | 75.6                | 1.7 | .871                | .44              | .54     | .946   |        |                                               |                                                               |                                                          |
|            | 75.8                       | 1.2 | 75.2                | 1.8 | .860                | .33              | .56     | .943   |        |                                               |                                                               |                                                          |
|            | 76.3                       | 1.3 | 75.6                | 2.0 | .871                | .44              | .63     | .937   |        |                                               |                                                               |                                                          |
|            | 77.3                       | 2.7 | 75.9                | 4.1 | .879                | .49              | 1.32    | .878   |        |                                               |                                                               |                                                          |
|            | 77.9                       | 3.7 | 76.0                | 5.6 | .882                | .48              | .86     | .836   |        |                                               |                                                               |                                                          |
|            | 78.1                       | 4.8 | 75.7                | 7.2 | .873                | .38              | 2.41    | .796   |        |                                               |                                                               |                                                          |
|            | 78.5                       | 5.7 | 75.6                | 8.6 | .871                | .31              | .93     | .761   |        |                                               |                                                               |                                                          |
| Noon.      | 79.1                       | 6.2 | 76.0                | 9.3 | .882                | .43              | 3.21    | .746   |        |                                               |                                                               |                                                          |
|            | 78.8                       | 6.4 | 75.6                | 9.6 | .871                | .29              | .32     | .737   |        |                                               |                                                               |                                                          |
|            | 79.3                       | 6.2 | 76.2                | 9.3 | .887                | .49              | .23     | .746   |        |                                               |                                                               |                                                          |
|            | 79.0                       | 6.0 | 76.0                | 9.0 | .882                | .43              | .10     | .753   |        |                                               |                                                               |                                                          |
|            | 78.6                       | 5.4 | 75.9                | 8.1 | .879                | .42              | 2.75    | .774   |        |                                               |                                                               |                                                          |
|            | 77.9                       | 4.5 | 75.6                | 6.8 | .871                | .35              | .26     | .805   |        |                                               |                                                               |                                                          |
|            | 77.7                       | 3.2 | 76.1                | 4.8 | .885                | .53              | 1.57    | .859   |        |                                               |                                                               |                                                          |
|            | 77.6                       | 2.5 | 76.3                | 3.8 | .890                | .61              | .23     | .887   |        |                                               |                                                               |                                                          |
|            | 77.4                       | 2.2 | 76.3                | 3.3 | .890                | .63              | .06     | .901   |        |                                               |                                                               |                                                          |
|            | 77.4                       | 1.8 | 76.5                | 2.7 | .896                | .69              | 0.87    | .918   |        |                                               |                                                               |                                                          |
|            | 77.2                       | 1.7 | 76.3                | 2.6 | .890                | .63              | .84     | .920   |        |                                               |                                                               |                                                          |
|            | 77.0                       | 1.6 | 76.2                | 2.4 | .887                | .62              | .76     | .927   |        |                                               |                                                               |                                                          |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in  
the month of October, 1854.*

Solar radiation, weather, &amp;c.

| Date.      | Max. Solar<br>radiation. | Rain.<br>Inches.                   | Prevailing direction<br>of the Wind.                                                                        | General Aspect of the Sky. |
|------------|--------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------|
|            |                          |                                    |                                                                                                             |                            |
| 1 Sunday.  | o                        |                                    |                                                                                                             |                            |
| 2 ..       | ..                       | S. or S. W. or W.                  | Cloudless till 8 A. M. cloudy afterwards<br>and drizzling at 4 P. M.                                        |                            |
| 3 141.0    | ..                       | Calm or N. E. or S.<br>E. or S. W. | Cloudless till 4 A. M. cloudy afterwards<br>and drizzling from 5 P. M. to 11 P. M.                          |                            |
| 4 142.0    | 0.11                     | S. W. or E. or W.                  | Cloudy till 9 P. M. cloudless afterwards.                                                                   |                            |
| 5 146.0    | ..                       | S. or N. E. or S.                  | Cloudless till 1 P. M. cloudy till 7 A. M.<br>cloudless afterwards.                                         |                            |
| 6 148.0    | ..                       | S. or E. or W. S. W.<br>or Calm.   | Cloudless till 7 A. M. cloudy afterwards,<br>cloudless at midnight.                                         |                            |
| 7 142.0    | 0.82                     | S. W. or W. S. W.<br>or S. E.      | Cloudless till 8 A. M. cloudy afterwards,<br>also drizzling between 7 and 8 P. M.                           |                            |
| 8 Sunday.  |                          |                                    |                                                                                                             |                            |
| 9 146.0    | ..                       | S. or N. or S.                     | Cloudless till 8 A. M. scattered $\wedge$ i after-<br>wards, also a shower of rain between<br>5 and 6 P. M. |                            |
| 10 ..      | 0.96                     | E. or S. E. or N. E.               | Cloudy the whole day with constant rain.                                                                    |                            |
| 11 ..      | 0.16                     | N. E. or S. E.                     | Cloudy the whole day, also drizzling at<br>11 A. M.                                                         |                            |
| 12 ..      | 0.26                     | S. or S. S. W. or S.               | Cloudy the whole day with occasional<br>drizzling.                                                          |                            |
| 13 120.0   | ..                       | S. or W.                           | Cloudy the whole day, also drizzling at<br>4 P. M.                                                          |                            |
| 14 138.0   | 0.26                     | S. E. or S. or E.                  | Clouds of various kind the whole day.                                                                       |                            |
| 15 Sunday. |                          |                                    |                                                                                                             |                            |
| 16 143.0   | ..                       | N. W. or W. or W.<br>N. W.         | Cloudless till 8 A. M. scattered $\wedge$ i till<br>6 P. M. cloudless afterwards.                           |                            |
| 17 144.0   | ..                       | N. W. or W.                        | Cloudless.                                                                                                  |                            |
| 18 142.0   | ..                       | W. or N. W.                        | Cloudless.                                                                                                  |                            |
| 19 140.0   | ..                       | W.                                 | Cloudless.                                                                                                  |                            |
| 20 145.0   | ..                       | W. or S. W.                        | Cloudless nearly the whole day.                                                                             |                            |
| 21 144.5   | ..                       | S. or W. or N. E.                  | Cloudless till 11 A. M. scattered $\wedge$ i or<br>$\wedge$ -i afterwards.                                  |                            |
| 22 Sunday. |                          |                                    |                                                                                                             |                            |
| 23 125.5   | 0.84                     | N. E. or E. or S. E.               | Cloudless till 5 A. M. cloudy afterwards,<br>also a shower of rain between 2 and<br>3 P. M.                 |                            |
| 24 ..      | 0.22                     | E. or S. E. or S.                  | Cloudy the whole day, also drizzling at<br>1 P. M.                                                          |                            |
| 25 115.0   | ..                       | E. or S. E. or S.                  | Cloudy.                                                                                                     |                            |
| 26 129.0   | ..                       | S.                                 | Cloudy, also drizzling at 8 P. M.                                                                           |                            |
| 27 120.0   | ..                       | S. or N.                           | Cloudless till 3 A. M. cloudy till 7 P. M.<br>cloudless afterwards.                                         |                            |
| 28 134.0   | 0.38                     | S. or N. E.                        | Nearly cloudy the whole day, also rain-<br>ing between 6 and 8 P. M.                                        |                            |
| 29 Sunday. |                          |                                    |                                                                                                             |                            |
| 30 145.5   | ..                       | S. or N. E.                        | Cloudy.                                                                                                     |                            |
| 31 143.0   | ..                       | N. or S. E.                        | Clouds of various kinds till 6 P. M.<br>cloudless afterwards.                                               |                            |



## Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the month of December, 1854.

Maximum pressure observed at 9.50 A. M.

| Date. | Barometer. | Temperature. |         |           | Direction of Wind. | Quantity of Rain. | Aspect of the Sky.      |
|-------|------------|--------------|---------|-----------|--------------------|-------------------|-------------------------|
|       |            | Of Mercury.  | Of Air. | Wet Bulb. |                    |                   |                         |
| 1     | 29.593     | 68.5         | 69.0    | 61.5      | E.                 | ..                | ✓ scattered             |
| 2     | 29.671     | 64.8         | 65.5    | 61.7      | N. E.              | ..                | ✓ ditto                 |
| 3     | 29.655     | 63.2         | 64.4    | 59.5      | N. W.              | ..                | ✓ ditto                 |
| 4     | 29.649     | 60.8         | 60.0    | 58.2      | N. W.              | ..                | Clear                   |
| 5     | 29.673     | 60.5         | 61.0    | 57.2      | N. W.              | ..                | Ditto                   |
| 6     | 29.657     | 61.5         | 62.5    | 57.0      | W.                 | ..                | Ditto                   |
| 7     | 29.607     | 61.0         | 62.8    | 57.4      | N. W.              | ..                | Ditto                   |
| 8     | 29.593     | 61.5         | 62.4    | 57.3      | N.                 | ..                | Ditto                   |
| 9     | 29.637     | 60.5         | 61.5    | 57.1      | N. E.              | ..                | ✓ scattered             |
| 10    | 29.765     | 61.0         | 62.3    | 55.5      | N.                 | ..                | ✓ ditto                 |
| 11    | 29.735     | 63.0         | 64.2    | 57.3      | N.                 | ..                | ✓ ditto                 |
| 12    | 29.725     | 61.8         | 62.5    | 56.5      | N.                 | ..                | ✓ ditto all over        |
| 13    | 29.741     | 66.0         | 66.6    | 59.5      | S. W.              | ..                | ✓ ditto ditto           |
| 14    | 29.709     | 67.5         | 68.5    | 64.0      | N. W.              | ..                | ✓ scattered             |
| 15    | 29.631     | 62.8         | 63.3    | 57.2      | N. W.              | ..                | ✓ ditto                 |
| 16    | 29.597     | 61.8         | 62.5    | 53.0      | N. W.              | ..                | Clear                   |
| 17    | 29.675     | 60.5         | 61.5    | 51.4      | N. W.              | ..                | Ditto                   |
| 18    | 29.645     | 58.9         | 60.4    | 51.0      | N.                 | ..                | Ditto                   |
| 19    | 29.579     | 61.5         | 63.0    | 53.8      | N. W.              | ..                | ✓ scattered             |
| 20    | 29.581     | 61.9         | 63.7    | 55.1      | S. E.              | ..                | Clear                   |
| 21    | 29.601     | 61.3         | 62.0    | 55.5      | N.                 | ..                | ✓ all over              |
| 22    | 29.589     | 61.5         | 62.6    | 56.0      | N.                 | ..                | ✓ ditto                 |
| 23    | 29.637     | 61.0         | 62.2    | 60.0      | N. E.              | ..                | ✓ ditto                 |
| 24    | 29.605     | 62.0         | 63.2    | 58.0      | N. W.              | ..                | Clear                   |
| 25    | 29.615     | 61.4         | 62.4    | 53.0      | N. W.              | ..                | ✓ scattered             |
| 26    | 29.615     | 60.0         | 61.2    | 52.0      | S. E.              | ..                | ✓ ditto                 |
| 27    | 29.593     | 60.0         | 61.2    | 53.9      | N. E.              | ..                | ✓ ditto towards E.      |
| 28    | 29.595     | 61.0         | 62.5    | 55.0      | E.                 | ..                | ✓ ditto towards S. hor. |
| 29    | 29.635     | 61.5         | 62.5    | 56.9      | N. E.              | ..                | Clear                   |
| 30    | 29.665     | 59.8         | 60.7    | 53.5      | N. W.              | ..                | ✓ scattered             |
| 31    | 29.615     | 59.8         | 60.7    | 52.0      | N. W.              | ..                | ✓ ditto                 |
| Mean. | 29.641     | 61.9         | 62.8    | 56.3      | ..                 | ..                | ....                    |

Barometer Observations corrected for Capillarity only.

Symbols. { ✓ Cirrus.  
 ↗ Cirro strata.  
 ↘ Cumuli.  
 ↙ Cumulo strata.  
 ↛ Nimbis or Nimbus.

*Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the month of December, 1854.*

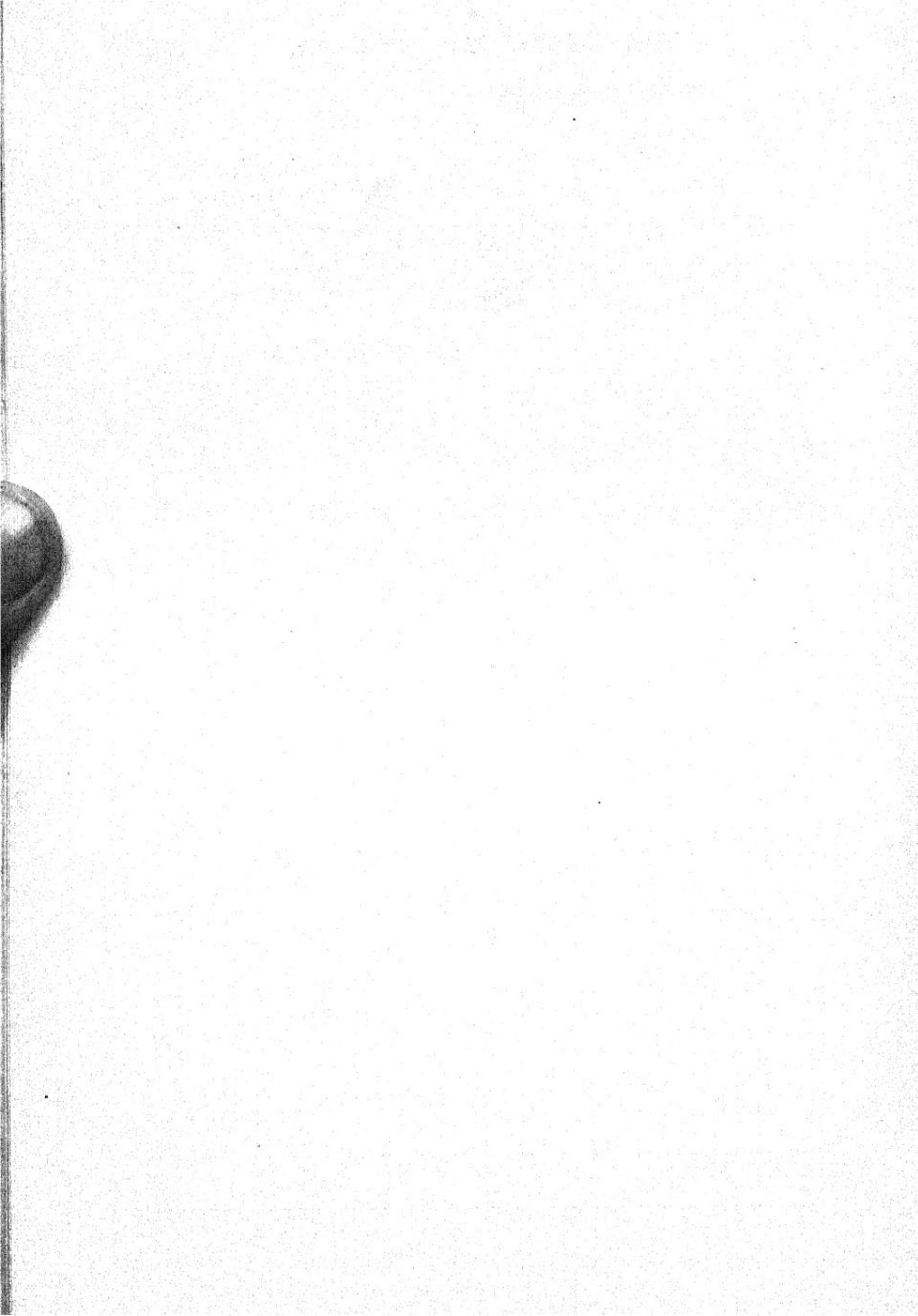
Observations at apparent Noon.

| Date. | Barometer. | Temperature. |         |           | Direction of Wind. | Quantity of Rain. | Aspect of the Sky.     |
|-------|------------|--------------|---------|-----------|--------------------|-------------------|------------------------|
|       |            | Of Mercury.  | Of Air. | Wet Bulb. |                    |                   |                        |
| 1     | 29.581     | 68.8         | 66.3    | 61.9      | N. W.              | ..                | ✓ all over             |
| 2     | 29.629     | 67.0         | 67.9    | 65.4      | N. E.              | ..                | ✓ scattered            |
| 3     | 29.625     | 66.5         | 66.9    | 61.0      | N. W.              | ..                | ✓ ditto [horison.      |
| 4     | 29.615     | 64.0         | 64.6    | 59.0      | N. W.              | ..                | ? scattered towards    |
| 5     | 29.635     | 63.9         | 64.3    | 57.2      | N. W.              | ..                | Clear                  |
| 6     | 29.629     | 64.2         | 65.0    | 55.4      | W.                 | ..                | Ditto                  |
| 7     | 29.555     | 64.4         | 64.4    | 58.0      | N. W.              | ..                | Ditto                  |
| 8     | 29.547     | 65.0         | 66.0    | 58.0      | N.                 | ..                | Ditto                  |
| 9     | 29.603     | 64.9         | 66.6    | 58.0      | N. E.              | ..                | ✓ scattered            |
| 10    | 29.717     | 64.0         | 65.0    | 57.8      | N.                 | ..                | ✓ ditto                |
| 11    | 29.717     | 67.0         | 68.0    | 58.5      | N.                 | ..                | ✓ ditto all over       |
| 12    | 29.693     | 66.4         | 66.8    | 57.2      | N.                 | ..                | ? ditto ditto          |
| 13    | 29.695     | 71.0         | 71.0    | 61.0      | S. W.              | ..                | ? ditto [wards hor.    |
| 14    | 29.655     | 72.2         | 73.0    | 65.0      | N. W.              | ..                | ? in zenith, ✓ to-     |
| 15    | 29.601     | 68.9         | 69.9    | 59.1      | N. W.              | ..                | ✓ scattered            |
| 16    | 29.555     | 69.0         | 69.5    | 54.5      | N. W.              | ..                | Clear                  |
| 17    | 29.619     | 65.0         | 66.2    | 52.7      | N. W.              | ..                | Ditto                  |
| 18    | 29.609     | 64.7         | 66.5    | 52.5      | N.                 | ..                | ✓ scattered            |
| 19    | 29.535     | 67.0         | 67.5    | 54.5      | S. W.              | ..                | ✓ ditto towards hor.   |
| 20    | 29.539     | 67.2         | 68.5    | 56.5      | S. E.              | ..                | ✓ all over             |
| 21    | 29.525     | 62.2         | 61.9    | 56.4      | E.                 | ..                | ✓ ditto                |
| 22    | 29.547     | 66.8         | 67.8    | 59.6      | N.                 | ..                | ✓ ditto                |
| 23    | 29.601     | 63.9         | 63.9    | 60.9      | N. E.              | ..                | ✓ ditto                |
| 24    | 29.575     | 66.7         | 66.9    | 59.8      | N. W.              | ..                | Clear                  |
| 25    | 29.577     | 64.0         | 64.5    | 55.0      | N. W.              | ..                | ✓ all over             |
| 26    | 29.565     | 63.5         | 63.8    | 53.4      | S. E.              | ..                | ✓ scattered            |
| 27    | 29.537     | 64.7         | 65.5    | 55.9      | E.                 | ..                | Clear [horison         |
| 28    | 29.555     | 65.0         | 67.0    | 56.8      | E.                 | ..                | ✓ scattered towards E. |
| 29    | 29.559     | 68.0         | 68.5    | 58.0      | N. E.              | ..                | Clear                  |
| 30    | 29.579     | 64.8         | 65.0    | 54.6      | N. W.              | ..                | ✓ scattered [hor.      |
| 31    | 29.587     | 63.7         | 65.5    | 54.0      | N. W.              | ..                | ✓ ditto towards W.     |
| Mean. | 29.598     | 65.9         | 66.5    | 57.6      | ..                 | ...               | ....                   |

Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the Month of December, 1854.

## Minimum pressure observed at 4 P. M.

| Date. | Barometer. | Temperature. |         |           | Maximum and Minimum. |          |       | Aspect of the Sky     | Direction of Wind. | Quantity of Rain. |
|-------|------------|--------------|---------|-----------|----------------------|----------|-------|-----------------------|--------------------|-------------------|
|       |            | Of Mercury.  | Of Air. | Wet Bulb. | Maximum.             | Minimum. | Mean. |                       |                    |                   |
| 1     | 29.501     | 63.5         | 62.0    | 60.5      | 61.4                 | 53.2     | 57.3  | ~- all over           | N. W.              | ..                |
| 2     | 29.565     | 70.8         | 70.3    | 65.5      | 70.5                 | 53.0     | 61.75 | ~- scattered          | N. E.              | ..                |
| 3     | 29.567     | 69.5         | 69.5    | 62.5      | 69.2                 | 52.4     | 60.8  | ~- ditto              | N. W.              | ..                |
| 4     | 29.585     | 69.8         | 68.8    | 59.2      | 68.4                 | 51.0     | 59.7  | Clear                 | N. W.              | ..                |
| 5     | 29.589     | 69.8         | 68.8    | 57.5      | 69.5                 | 51.1     | 60.3  | Ditto                 | N. W.              | ..                |
| 6     | 29.583     | 69.8         | 68.8    | 57.5      | 68.5                 | 51.0     | 59.75 | Ditto                 | N. W.              | ..                |
| 7     | 29.495     | 69.6         | 68.5    | 57.5      | 68.2                 | 50.5     | 59.35 | Ditto                 | N. W.              | ..                |
| 8     | 29.515     | 69.9         | 68.8    | 58.0      | 68.8                 | 50.0     | 59.4  | Ditto                 | N.                 | ..                |
| 9     | 29.561     | 68.4         | 67.5    | 59.5      | 68.3                 | 52.3     | 60.3  | ~- scattered          | N. E.              | ..                |
| 10    | 29.        | 68.9         | 68.5    | 59.5      | 68.5                 | 51.6     | 60.05 | ~- ditto              | N.                 | ..                |
| 11    | 29.677     | 73.5         | 72.2    | 59.8      | 71.9                 | 51.8     | 61.85 | ~- ditto              | N.                 | ..                |
| 12    | 29.639     | 68.9         | 68.5    | 60.9      | 68.7                 | 52.0     | 60.35 | ~- all over           | N.                 | ..                |
| 13    | 29.661     | 73.4         | 72.4    | 62.6      | 72.4                 | 62.4     | 62.4  | ~- all over scattered | S. E.              | ..                |
| 14    | 29.605     | 77.2         | 76.0    | 64.2      | 76.0                 | 51.7     | 63.85 | ~- scattered          | N. W.              | ..                |
| 15    | 29.539     | 69.0         | 68.3    | 59.0      | 68.3                 | 51.0     | 59.65 | ~- all over           | N. W.              | ..                |
| 16    | 29.519     | 73.5         | 71.8    | 57.5      | 72.0                 | 50.0     | 61.0  | Clear                 | N. W.              | ..                |
| 17    | 29.573     | 74.0         | 73.8    | 55.0      | 73.5                 | 50.4     | 61.95 | Ditto                 | N. W.              | ..                |
| 18    | 29.569     | 73.2         | 71.4    | 57.8      | 72.0                 | 49.4     | 60.7  | Ditto                 | N.                 | ..                |
| 19    | 29.479     | 71.0         | 70.5    | 55.8      | 70.5                 | 51.4     | 60.95 | ....                  | ..                 | ..                |
| 20    | 29.485     | 71.7         | 71.7    | 58.5      | 71.5                 | 51.0     | 61.25 | ~- scattered          | S. E.              | ..                |
| 21    | 29.481     | 67.8         | 68.4    | 57.9      | 68.0                 | 52.0     | 60.0  | ~- all over           | S. E.              | ..                |
| 22    | 29.505     | 69.9         | 69.0    | 61.2      | 69.5                 | 52.2     | 60.85 | ~- scattered          | N. E.              | ..                |
| 23    | 29.559     | 65.5         | 64.9    | 61.4      | 64.9                 | 52.0     | 58.45 | ~- all over           | N. E.              | ..                |
| 24    | 29.547     | 70.5         | 70.0    | 61.5      | 69.5                 | 51.6     | 60.55 | Clear                 | N. W.              | ..                |
| 25    | 29.505     | 66.5         | 66.0    | 57.0      | 66.2                 | 51.2     | 58.7  | ~- scattered          | N. W.              | ..                |
| 26    | 29.517     | 69.5         | 67.7    | 56.3      | 67.5                 | 50.0     | 58.75 | ~- ditto towards      | N. E.              | ..                |
| 27    | 29.491     | 69.9         | 68.3    | 59.8      | 68.0                 | 49.7     | 58.85 | Clear, [E. hor.       | E.                 | ..                |
| 28    | 29.505     | 71.5         | 70.0    | 61.2      | 70.4                 | 50.4     | 60.4  | Ditto                 | N. E.              | ..                |
| 29    | 29.537     | 71.7         | 70.0    | 58.3      | 70.3                 | 50.5     | 60.4  | Ditto                 | N. W.              | ..                |
| 30    | 29.553     | 69.5         | 68.8    | 56.0      | 69.0                 | 48.5     | 58.75 | ~- scattered          | N. W.              | ..                |
| 31    | 29.505     | 68.8         | 68.5    | 55.8      | 68.5                 | 50.0     | 59.25 | ~- ditto towards      | N. W.              | ..                |
|       |            |              |         |           |                      |          |       | [W. hor.              |                    | ..                |
| Mean. | 29.529     | 70.2         | 69.3    | 59.1      | 69.3                 | 51.1     | 60.24 | ....                  | ..                 | ..                |



Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the month of February, 1855.

| Maximum pressure observed at 9.50 A. M. |            |              |         |           |                    |                   |                             |
|-----------------------------------------|------------|--------------|---------|-----------|--------------------|-------------------|-----------------------------|
| Date.                                   | Barometer. | Temperature. |         |           | Direction of Wind. | Quantity of Rain. | Aspect of the Sky.          |
|                                         |            | Of Mercury.  | Of Air. | Wet Bulb. |                    |                   |                             |
| 1                                       | 29.715     | 63.5         | 65.0    | 53.0      | W.                 | ..                | Clear                       |
| 2                                       | 29.665     | 65.0         | 66.6    | 55.4      | W.                 | ..                | ✓ scattered towards hor.    |
| 3                                       | 29.619     | 65.5         | 66.5    | 55.9      | S. E.              | ..                | ✓ scattered                 |
| 4                                       | 29.679     | 65.0         | 66.4    | 55.5      |                    | ..                | Clear                       |
| 5                                       | 29.673     | 66.0         | 68.7    | 58.2      | N. E.              | ..                | Ditto                       |
| 6                                       | 29.805     | 66.9         | 68.5    | 56.0      | N.                 | ..                | Ditto                       |
| 7                                       | 29.755     | 64.4         | 65.4    | 55.0      | N.                 | ..                | Ditto                       |
| 8                                       | 29.629     | 66.9         | 67.7    | 56.0      | S. W.              | ..                | Ditto                       |
| 9                                       | 29.555     | 69.          | 70.9    | 58.4      | N.                 | ..                | Ditto                       |
| 10                                      | 29.639     | 69.9         | 71.8    | 58.6      | N. E.              | ..                | Ditto                       |
| 11                                      | 29.561     | 71.5         | 72.9    | 62.0      | E.                 | ..                | Ditto                       |
| 12                                      | 29.577     | 68.9         | 69.9    | 58.0      | N. E.              | ..                | Ditto                       |
| 13                                      | 29.543     | 66.6         | 68.3    | 58.0      | N. W.              | ..                | Ditto                       |
| 14                                      | 29.609     | 69.0         | 70.3    | 56.4      | N. W.              | ..                | Ditto                       |
| 15                                      | 29.487     | 68.9         | 69.9    | 56.0      | N. W.              | ..                | ✓ scattered all over        |
| 16                                      | 29.497     | 71.0         | 73.8    | 59.0      | N. E.              | ..                | Clear                       |
| 17                                      | 29.491     | 71.9         | 74.0    | 58.4      | N. E.              | ..                | ✓ scattered                 |
| 18                                      | 29.489     | 66.0         | 64.0    | 62.0      | N. E.              | ..                | ✓ all over                  |
| 19                                      | 29.409     | 64.8         | 64.6    | 62.5      | E.                 | ..                | ✓ scattered                 |
| 20                                      | 29.475     | 65.0         | 65.2    | 58.5      | W.                 | ..                | Clear                       |
| 21                                      | 29.459     | 66.5         | 67.3    | 59.0      | N. W.              | ..                | Ditto                       |
| 22                                      | 29.509     | 65.9         | 67.4    | 59.4      | N. W.              | ..                | ✓ scattered                 |
| 23                                      | 29.479     | 71.1         | 71.7    | 62.0      | N. W.              | ..                | ✓ scattered towards hor.    |
| 24                                      | 29.555     | 70.0         | 71.0    | 64.0      | S.                 | ..                | ✓ scattered in zenith       |
| 25                                      | 29.535     | 72.2         | 74.3    | 62.1      | N.                 | ..                | Clear                       |
| 26                                      | 29.663     | 73.0         | 74.9    | 60.7      | N.                 | ..                | ✓ very few scat. in zenith. |
| 27                                      | 29.655     | 74.5         | 75.4    | 61.5      | N. W.              | ..                | Clear                       |
| 28                                      | 29.577     | 73.0         | 73.8    | 63.0      | S. E.              | ..                | ✓ scattered                 |
| Mean.                                   | 29.582     | 67.2         | 69.5    | 58.7      | ..                 | ..                | ....                        |

Barometer Observations corrected for Capillarity only.

Symbol. { ✓ Cirrus.  
          { Cirro strata.  
          { Cumuli.  
          { Cumulo strata.  
          { Nimbi or Nimbus.

*Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the month of February, 1855.*

Observations at apparent Noon.

| Date. | Barometer. | Temperature. |         |           | Direction of Wind. | Quantity of Rain. | Aspect of the Sky.      |
|-------|------------|--------------|---------|-----------|--------------------|-------------------|-------------------------|
|       |            | Of Mercury.  | Of Air. | Wet Bulb. |                    |                   |                         |
| 1     | 29.669     | 68.8         | 69.6    | 55.3      | W.                 | ..                | Clear                   |
| 2     | 29.619     | 70.0         | 72.0    | 55.5      | W.                 | ..                | ~ seat. towards E. hor. |
| 3     | 29.583     | 69.8         | 72.1    | 57.8      | E.                 | ..                | ~ scattered             |
| 4     | 29.655     | 67.2         | 68.5    | 56.3      |                    | ..                |                         |
| 5     | 29.633     | 70.8         | 73.8    | 59.0      | N. E.              | ..                | Clear                   |
| 6     | 29.779     | 71.0         | 72.4    | 57.0      | N.                 | ..                | Ditto                   |
| 7     | 29.695     | 70.9         | 71.7    | 56.0      | N. W.              | ..                | Ditto                   |
| 8     | 29.579     | 71.5         | 72.8    | 58.0      | W.                 | ..                | Ditto                   |
| 9     | 29.505     | 73.8         | 74.8    | 59.5      | S. W.              | ..                | Ditto                   |
| 10    | 29.575     | 75.5         | 77.3    | 61.0      | E.                 | ..                | Ditto                   |
| 11    | 29.525     | 79.3         | 80.7    | 63.0      | E.                 | ..                | Ditto                   |
| 12    | 29.543     | 75.2         | 77.0    | 59.9      | N.                 | ..                | Ditto                   |
| 13    | 29.513     | 74.2         | 75.6    | 60.0      | N. W.              | .                 | Ditto                   |
| 14    | 29.579     | 74.9         | 76.9    | 57.5      | N. W.              | ..                | Ditto                   |
| 15    | 29.447     | 75.5         | 76.5    | 57.5      | N. W.              | ..                | ~ scattered towards W.  |
| 16    | 29.461     | 75.0         | 76.0    | 60.5      | E.                 | ..                | Clear                   |
| 17    | 29.447     | 75.0         | 76.0    | 62.6      | N. E.              | ..                | ~ scattered             |
| 18    | 29.437     | 65.0         | 63.5    | 62.1      | N.                 | 092               | ~ all over              |
| 19    | 29.369     | 66.7         | 66.9    | 64.1      | N. W.              | ..                | ~ scattered             |
| 20    | 29.451     | 69.0         | 70.9    | 57.5      | S.                 | ..                | Clear                   |
| 21    | 29.407     | 70.4         | 71.6    | 60.2      | N. W.              | ..                | Ditto                   |
| 22    | 29.489     | 72.0         | 73.5    | 60.4      | W.                 | ..                | ~ scattered towards S.  |
| 23    | 29.445     | 74.5         | 75.0    | 63.4      | S. E.              | ..                | ~ very few scattered    |
| 24    | 29.517     | 73.5         | 73.6    | 62.5      | S.                 | ..                | Clear                   |
| 25    | 29.493     | 75.5         | 76.8    | 62.7      | N. W.              | ..                | Ditto                   |
| 26    | 29.635     | 76.4         | 78.0    | 60.7      | N. E.              | ..                | Ditto                   |
| 27    | 29.605     | 77.6         | 78.0    | 62.5      | E.                 | ..                | Ditto                   |
| 28    | 29.527     | 77.0         | 77.8    | 64.5      | S. E.              | ..                | ~ scattered             |
| Mean. | 29.542     | 72.7         | 77.4    | 59.8      | ..                 | ..                | ....                    |

Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the Month of February, 1855.

Minimum pressure observed at 4 P. M.

|       | Date.  | Barometer. | Temperature. |         | Maximum and Minimum. |          |       | Aspect of the Sky.  | Direction of Wind. | Quantity of Rain. |
|-------|--------|------------|--------------|---------|----------------------|----------|-------|---------------------|--------------------|-------------------|
|       |        |            | Of Mercury.  | Of Air. | Maximum.             | Minimum. | Mean. |                     |                    |                   |
| 1     | 29.609 | 74.5       | 74.3         | 54.5    | 74.7                 | 51.5     | 63.1  | \ scat. in zenith   | W.                 | ..                |
| 2     | 29.565 | 74.9       | 74.5         | 57.8    | 75.5                 | 53.2     | 64.35 | Clear               | N. W.              | ..                |
| 3     | 29.515 | 73.0       | 73.0         | 60.2    | 74.7                 | 59.5     | 67.1  | \ scattered         | E.                 | ..                |
| 4     | 29.597 | 72.0       | 72.3         | 57.5    | 72.5                 | 55.0     | 63.75 |                     |                    | ..                |
| 5     | 29.589 | 74.0       | 75.0         | 59.0    | 75.0                 | 55.0     | 65.0  | Clear               | N.                 | ..                |
| 6     | 29.729 | 74.8       | 75.0         | 58.0    | 74.2                 | 54.5     | 64.35 | \ scattered         | N. W.              | ..                |
| 7     | 29.655 | 75.3       | 74.6         | 60.0    | 74.6                 | 53.0     | 63.8  | Clear               | N. W.              | ..                |
| 8     | 29.505 | 76.8       | 75.0         | 60.5    | 78.8                 | 58.8     | 68.8  | \ scattered         | N. W.              | ..                |
| 9     | 29.475 | 78.5       | 79.0         | 60.5    | 79.0                 | 60.0     | 69.5  | Clear               | N. W.              | ..                |
| 10    | 29.519 | 79.9       | 81.0         | 62.0    | 80.9                 | 61.0     | 70.95 | \ scattered         | E.                 | ..                |
| 11    | 29.483 | 82.1       | 82.4         | 64.5    | 82.0                 | 62.5     | 72.25 | Clear               | E.                 | ..                |
| 12    | 29.477 | 81.9       | 82.2         | 62.2    | 82.0                 | 60.5     | 71.25 | Ditto               | N. W.              | ..                |
| 13    | 29.459 | 79.9       | 79.3         | 60.4    | 80.2                 | 59.0     | 69.6  | \ scattered         | N. W.              | ..                |
| 14    | 29.495 | 80.2       | 80.5         | 60.2    | 80.2                 | 57.0     | 68.6  | \ very few scat. in | N. W.              | ..                |
| 15    | 29.395 | 78.0       | 77.0         | 61.2    | 77.0                 | 57.5     | 67.25 | \ all over [zenith, | W.                 | ..                |
| 16    | 29.397 | 78.9       | 79.9         | 61.4    | 79.9                 | 60.5     | 70.2  | Clear               | N. E.              | ..                |
| 17    | 29.349 | 79.0       | 79.0         | 63.6    | 79.5                 | 62.7     | 71.1  |                     |                    | ..                |
| 18    | 29.405 | 67.2       | 67.0         | 62.3    | 67.0                 | 62.0     | 64.5  | \ scattered         | N.                 | ..                |
| 19    | 29.319 | 71.9       | 71.9         | 64.3    | 71.5                 | 60.5     | 66.0  | \ scattered         | N. W.              | ..                |
| 20    | 29.401 | 76.0       | 75.9         | 60.5    |                      |          |       | Clear               | W.                 | ..                |
| 21    | 29.389 | 77.3       | 77.0         | 61.9    |                      |          |       | Ditto               | N. W.              | ..                |
| 22    | 29.393 | 80.9       | 79.6         | 64.3    |                      |          |       | \ scattered [N. W.  | N. W.              | ..                |
| 23    | 29.385 | 78.0       | 77.5         | 63.5    |                      |          |       | \ scattered towards | N.                 | ..                |
| 24    | 29.471 | 77.5       | 77.2         | 63.0    |                      |          |       | \ scattered         | S. E.              | ..                |
| 25    | 29.447 | 78.9       | 79.2         | 64.1    |                      |          |       | ditto [zenith       | N. W.              | ..                |
| 26    | 29.571 | 81.5       | 82.5         | 62.8    |                      |          |       | \ very few scat. in | N. W.              | ..                |
| 27    | 29.505 | 81.0       | 82.0         | 63.4    |                      |          |       | \ scattered         | E.                 | ..                |
| 28    | 29.471 | 79.9       | 79.0         | 66.2    |                      |          |       | ditto               | S. E.              | ..                |
| Mean. | 29.484 | 77.2       | 77.1         | 61.4    | 76.8                 | 58.0     | 67.4  | ....                | ..                 | ..                |

Observations not taken  
from the 20th to the  
28th of February.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of November, 1854.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Daily Means, &c. of the observations and of the hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |       | Mean Dry Bulb<br>Thermometer. | Range of the Tem-<br>perature during<br>the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|-------|-------------------------------|--------------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff. |                               | Max.                                             | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | °     | °                             | °                                                | °    | °     |
| 1     | 29.921                                          | 30.008                                    | 29.847  | .161  | 80.7                          | 87.2                                             | 76.2 | 11.0  |
| 2     | .859                                            | 29.932                                    | .799    | .133  | 81.1                          | 87.6                                             | 76.6 | 11.0  |
| 3     | .880                                            | .955                                      | .819    | .136  | 82.2                          | 88.0                                             | 78.0 | 10.0  |
| 4     | .882                                            | .961                                      | .824    | .137  | 80.8                          | 86.8                                             | 77.2 | 9.6   |
| 5     | <i>Sunday.</i>                                  |                                           |         |       |                               |                                                  |      |       |
| 6     | .871                                            | .935                                      | .810    | .125  | 78.7                          | 83.6                                             | 75.0 | 8.6   |
| 7     | .870                                            | .918                                      | .834    | .084  | 74.3                          | 79.0                                             | 71.2 | 7.8   |
| 8     | .858                                            | .934                                      | .774    | .160  | 73.8                          | 77.6                                             | 70.2 | 7.4   |
| 9     | .979                                            | 30.039                                    | .900    | .139  | 76.4                          | 82.8                                             | 71.8 | 11.0  |
| 10    | 30.070                                          | .141                                      | 30.013  | .128  | 75.2                          | 82.0                                             | 69.0 | 13.0  |
| 11    | .080                                            | .142                                      | .031    | .111  | 74.2                          | 81.4                                             | 68.3 | 13.1  |
| 12    | <i>Sunday.</i>                                  |                                           |         |       |                               |                                                  |      |       |
| 13    | .018                                            | .094                                      | 29.965  | .129  | 72.4                          | 81.0                                             | 65.2 | 15.8  |
| 14    | 29.986                                          | .061                                      | .929    | .132  | 74.4                          | 82.7                                             | 67.8 | 14.9  |
| 15    | .982                                            | .050                                      | .931    | .119  | 75.8                          | 82.5                                             | 70.9 | 11.6  |
| 16    | .992                                            | .074                                      | .939    | .135  | 75.4                          | 82.8                                             | 70.4 | 12.4  |
| 17    | 30.021                                          | .101                                      | .972    | .129  | 74.6                          | 82.8                                             | 68.6 | 14.2  |
| 18    | 29.997                                          | .075                                      | .928    | .147  | 72.6                          | 81.5                                             | 65.8 | 15.7  |
| 19    | <i>Sunday.</i>                                  |                                           |         |       |                               |                                                  |      |       |
| 20    | 30.019                                          | .078                                      | .971    | .107  | 69.9                          | 78.8                                             | 63.0 | 15.8  |
| 21    | .054                                            | .126                                      | 30.006  | .120  | 70.2                          | 79.7                                             | 61.8 | 17.9  |
| 22    | .057                                            | .145                                      | 29.997  | .148  | 70.8                          | 79.6                                             | 63.6 | 16.0  |
| 23    | .025                                            | .085                                      | .955    | .130  | 71.0                          | 78.2                                             | 64.7 | 13.5  |
| 24    | .037                                            | .111                                      | .998    | .113  | 71.9                          | 79.6                                             | 65.4 | 14.2  |
| 25    | .072                                            | .150                                      | 30.024  | .126  | 71.5                          | 79.7                                             | 65.6 | 14.1  |
| 26    | <i>Sunday.</i>                                  |                                           |         |       |                               |                                                  |      |       |
| 27    | .017                                            | .091                                      | 29.945  | .146  | 72.4                          | 79.6                                             | 65.6 | 14.0  |
| 28    | 29.997                                          | .061                                      | .933    | .128  | 72.6                          | 80.0                                             | 66.8 | 13.2  |
| 29    | 30.015                                          | .082                                      | .957    | .125  | 72.3                          | 80.4                                             | 66.0 | 14.4  |
| 30    | .052                                            | .136                                      | .994    | .142  | 72.5                          | 80.6                                             | 66.2 | 14.4  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of November, 1854.*

Daily Means, &c. of the observations and of the hygrometrical elements  
dependent thereon. (*Continued.*)

| Date. | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a cubic foot of air. | Additional weight of Vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|-------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
|       | o                          | o                   | o                   | Inches.                   | T. gr.                        | T. gr.                                        |                                                               |                                                           |
| 1     | 77.7                       | 3.0                 | 76.2                | 4.5                       | 0.887                         | 9.56                                          | 1.48                                                          | 0.866                                                     |
| 2     | 78.0                       | 3.1                 | 76.4                | 4.7                       | .893                          | .62                                           | .55                                                           | .861                                                      |
| 3     | 79.0                       | 3.2                 | 77.4                | 4.8                       | .922                          | .91                                           | .63                                                           | .859                                                      |
| 4     | 77.5                       | 3.3                 | 75.8                | 5.0                       | .876                          | .44                                           | .63                                                           | .853                                                      |
| 5     | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 6     | 76.1                       | 2.6                 | 74.8                | 3.9                       | .849                          | .19                                           | .22                                                           | .883                                                      |
| 7     | 72.5                       | 1.8                 | 71.6                | 2.7                       | .766                          | 8.35                                          | 0.77                                                          | .916                                                      |
| 8     | 71.8                       | 2.0                 | 70.8                | 3.0                       | .746                          | .15                                           | .83                                                           | .908                                                      |
| 9     | 73.1                       | 3.3                 | 71.4                | 5.0                       | .761                          | .27                                           | 1.45                                                          | .851                                                      |
| 10    | 70.7                       | 4.5                 | 68.4                | 6.8                       | .690                          | 7.51                                          | .86                                                           | .801                                                      |
| 11    | 69.4                       | 4.8                 | 67.0                | 7.2                       | .659                          | .20                                           | .89                                                           | .792                                                      |
| 12    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 13    | 67.4                       | 5.0                 | 64.9                | 7.5                       | .615                          | 6.74                                          | .86                                                           | .784                                                      |
| 14    | 70.5                       | 3.9                 | 68.5                | 5.9                       | .692                          | 7.56                                          | .59                                                           | .826                                                      |
| 15    | 71.9                       | 3.9                 | 69.9                | 5.9                       | .725                          | .88                                           | .66                                                           | .826                                                      |
| 16    | 71.4                       | 4.0                 | 69.4                | 6.0                       | .713                          | .77                                           | .66                                                           | .824                                                      |
| 17    | 70.0                       | 4.6                 | 67.7                | 6.9                       | .674                          | .36                                           | .84                                                           | .800                                                      |
| 18    | 67.4                       | 5.2                 | 64.8                | 7.8                       | .613                          | 6.72                                          | .94                                                           | .776                                                      |
| 19    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 20    | 64.9                       | 5.0                 | 62.4                | 7.5                       | .567                          | .23                                           | .75                                                           | .781                                                      |
| 21    | 65.5                       | 4.7                 | 63.1                | 7.1                       | .580                          | .38                                           | .67                                                           | .793                                                      |
| 22    | 66.6                       | 4.2                 | 64.5                | 6.3                       | .607                          | .68                                           | .52                                                           | .815                                                      |
| 23    | 66.7                       | 4.3                 | 64.5                | 6.5                       | .607                          | .67                                           | .58                                                           | .808                                                      |
| 24    | 67.8                       | 4.1                 | 65.7                | 6.2                       | .632                          | .94                                           | .54                                                           | .818                                                      |
| 25    | 67.3                       | 4.2                 | 65.2                | 6.3                       | .621                          | .83                                           | .55                                                           | .815                                                      |
| 26    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 27    | 68.5                       | 3.9                 | 66.5                | 5.9                       | .648                          | 7.10                                          | .50                                                           | .826                                                      |
| 28    | 68.7                       | 3.9                 | 66.7                | 5.9                       | .653                          | .14                                           | .52                                                           | .824                                                      |
| 29    | 68.0                       | 4.3                 | 65.8                | 6.5                       | .634                          | 6.94                                          | .64                                                           | .809                                                      |
| 30    | 68.1                       | 4.4                 | 65.9                | 6.6                       | .636                          | .96                                           | .67                                                           | .806                                                      |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in  
the month of November, 1854.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.      | Mean Height of the Barometer at 32° Fahr. | Range of the Barometer for each hour during the month. |         |         | Mean Dry Bulb Thermometer. | Range of the Temperature for each hour during the month. |      |       |
|------------|-------------------------------------------|--------------------------------------------------------|---------|---------|----------------------------|----------------------------------------------------------|------|-------|
|            |                                           | Max.                                                   | Min.    | Diff.   |                            | Max.                                                     | Min. | Diff. |
|            | Inches.                                   | Inches.                                                | Inches. | Inches. | °                          | °                                                        | °    | °     |
| Mid-night. | 29.982                                    | 30.078                                                 | 29.828  | 0.250   | 71.7                       | 79.2                                                     | 65.4 | 13.8  |
| 1          | .976                                      | .082                                                   | .819    | .263    | 71.2                       | 78.8                                                     | 64.8 | 14.0  |
| 2          | .967                                      | .073                                                   | .805    | .268    | 70.7                       | 78.6                                                     | 64.2 | 14.4  |
| 3          | .960                                      | .067                                                   | .790    | .277    | 70.4                       | 78.8                                                     | 63.9 | 14.9  |
| 4          | .958                                      | .056                                                   | .774    | .282    | 70.0                       | 78.3                                                     | 63.0 | 15.3  |
| 5          | .966                                      | .076                                                   | .781    | .295    | 69.5                       | 78.2                                                     | 62.6 | 15.6  |
| 6          | .986                                      | .088                                                   | .813    | .275    | 69.2                       | 78.0                                                     | 61.8 | 16.2  |
| 7          | 30.011                                    | .111                                                   | .848    | .263    | 69.3                       | 78.8                                                     | 62.2 | 16.6  |
| 8          | .037                                      | .128                                                   | .875    | .253    | 72.4                       | 80.8                                                     | 66.7 | 14.1  |
| 9          | .055                                      | .150                                                   | .897    | .253    | 74.8                       | 82.8                                                     | 70.2 | 12.6  |
| 10         | .051                                      | .144                                                   | .898    | .246    | 76.8                       | 84.2                                                     | 73.2 | 11.0  |
| 11         | .033                                      | .132                                                   | .888    | .244    | 78.8                       | 85.4                                                     | 75.2 | 10.2  |
|            |                                           |                                                        |         |         |                            |                                                          |      |       |
| Noon.      | .003                                      | .107                                                   | .874    | .233    | 80.0                       | 86.4                                                     | 76.0 | 10.4  |
| 1          | 29.970                                    | .080                                                   | .842    | .238    | 80.8                       | 87.2                                                     | 73.6 | 13.6  |
| 2          | .949                                      | .059                                                   | .818    | .241    | 81.4                       | 87.6                                                     | 74.0 | 13.6  |
| 3          | .938                                      | .041                                                   | .803    | .238    | 81.2                       | 88.0                                                     | 71.2 | 16.8  |
| 4          | .936                                      | .033                                                   | .799    | .234    | 79.4                       | 86.6                                                     | 72.0 | 14.6  |
| 5          | .942                                      | .042                                                   | .803    | .239    | 78.1                       | 85.4                                                     | 72.0 | 13.4  |
| 6          | .951                                      | .052                                                   | .820    | .232    | 76.2                       | 84.0                                                     | 71.9 | 12.1  |
| 7          | .974                                      | .078                                                   | .846    | .232    | 75.0                       | 82.8                                                     | 70.2 | 12.6  |
| 8          | .991                                      | .087                                                   | .850    | .237    | 73.9                       | 81.6                                                     | 68.7 | 12.9  |
| 9          | 30.000                                    | .094                                                   | .861    | .233    | 73.1                       | 81.0                                                     | 68.2 | 12.8  |
| 10         | .002                                      | .112                                                   | .866    | .246    | 72.4                       | 80.6                                                     | 67.2 | 13.4  |
| 11         | 29.998                                    | .084                                                   | .865    | .219    | 71.9                       | 79.8                                                     | 66.2 | 13.6  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in  
the Month of November, 1854.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Wet Bulb Thermometer. |      | Dry Bulb above Wet. |       | Computed Dew Point. |        | Mean Elastic force of Vapour.<br>Inches. | T. gr. | T. gr. | Mean Weight of Vapour in a Cubic foot of Air. | Additional weight of vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|------------|----------------------------|------|---------------------|-------|---------------------|--------|------------------------------------------|--------|--------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
|            | Dry                        | Bulb | Bulb                | above | Dew                 | Point. |                                          |        |        |                                               |                                                               |                                                           |
| Mid-night. | 69.7                       | 2.0  | 68.7                | 3.0   | 0.697               | 7.64   |                                          | 0.79   |        | 0.906                                         |                                                               |                                                           |
| 1          | 69.3                       | 1.9  | 68.3                | 2.9   | .688                | .55    |                                          | .75    |        | .910                                          |                                                               |                                                           |
| 2          | 68.9                       | 1.8  | 68.0                | 2.7   | .681                | .48    |                                          | .70    |        | .914                                          |                                                               |                                                           |
| 3          | 68.6                       | 1.8  | 67.7                | 2.7   | .674                | .42    |                                          | .68    |        | .916                                          |                                                               |                                                           |
| 4          | 68.2                       | 1.8  | 67.3                | 2.7   | .666                | .33    |                                          | .67    |        | .916                                          |                                                               |                                                           |
| 5          | 67.9                       | 1.6  | 67.1                | 2.4   | .661                | .29    |                                          | .59    |        | .925                                          |                                                               |                                                           |
| 6          | 67.6                       | 1.6  | 66.8                | 2.4   | .655                | .23    |                                          | .58    |        | .926                                          |                                                               |                                                           |
| 7          | 67.8                       | 1.5  | 67.0                | 2.3   | .659                | .27    |                                          | .56    |        | .928                                          |                                                               |                                                           |
| 8          | 69.5                       | 2.9  | 68.0                | 4.4   | .681                | .47    |                                          | 1.13   |        | .869                                          |                                                               |                                                           |
| 9          | 70.8                       | 4.0  | 68.8                | 6.0   | .699                | .62    |                                          | .64    |        | .823                                          |                                                               |                                                           |
| 10         | 71.6                       | 5.2  | 69.0                | 7.8   | .704                | .64    |                                          | 2.19   |        | .777                                          |                                                               |                                                           |
| 11         | 72.3                       | 6.5  | 69.0                | 9.8   | .704                | .60    |                                          | .84    |        | .728                                          |                                                               |                                                           |
|            |                            |      |                     |       |                     |        |                                          |        |        |                                               |                                                               |                                                           |
| Noon.      | 72.7                       | 7.3  | 69.0                | 11.0  | .704                | .59    |                                          | 3.22   |        | .702                                          |                                                               |                                                           |
| 1          | 73.1                       | 7.7  | 69.2                | 11.6  | .708                | .62    |                                          | .45    |        | .688                                          |                                                               |                                                           |
| 2          | 73.3                       | 8.1  | 69.2                | 12.2  | .708                | .62    |                                          | .65    |        | .676                                          |                                                               |                                                           |
| 3          | 73.0                       | 8.2  | 68.9                | 12.3  | .701                | .55    |                                          | .66    |        | .674                                          |                                                               |                                                           |
| 4          | 72.3                       | 7.1  | 68.7                | 10.7  | .697                | .52    |                                          | .10    |        | .708                                          |                                                               |                                                           |
| 5          | 72.2                       | 5.9  | 69.2                | 8.9   | .708                | .67    |                                          | 2.55   |        | .750                                          |                                                               |                                                           |
| 6          | 72.2                       | 4.0  | 70.2                | 6.0   | .732                | .95    |                                          | 1.71   |        | .823                                          |                                                               |                                                           |
| 7          | 71.7                       | 3.3  | 70.0                | 5.0   | .727                | .92    |                                          | .39    |        | .851                                          |                                                               |                                                           |
| 8          | 71.3                       | 2.6  | 70.0                | 3.9   | .727                | .94    |                                          | .07    |        | .881                                          |                                                               |                                                           |
| 9          | 70.9                       | 2.2  | 69.8                | 3.3   | .722                | .90    |                                          | 0.89   |        | .899                                          |                                                               |                                                           |
| 10         | 70.4                       | 2.0  | 69.4                | 3.0   | .713                | .81    |                                          | .79    |        | .908                                          |                                                               |                                                           |
| 11         | 69.8                       | 2.1  | 68.7                | 3.2   | .697                | .64    |                                          | .84    |        | .931                                          |                                                               |                                                           |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in  
the month of November, 1854.*

Solar radiation, Weather, &c.

| Date.      | Max. Solar radiation. | Rain. | Prevailing direction of the Wind. | General Aspect of the sky.                                                                                          |
|------------|-----------------------|-------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------|
|            | o                     | Inch. |                                   |                                                                                                                     |
| 1          | 147.0                 |       | S.                                | Cloudless till 8 A. M. scattered $\cap i$ till 4 P. M. Cloudless afterwards. Also fogs in the morning. [afterwards. |
| 2          | 142.5                 |       | S. or S. W.                       | Cloudless till 9 A. M. scattered $\cap i$ or $\backslash i$                                                         |
| 3          | 141.5                 |       | S. or S. W.                       | Scattered $\backslash i$ or $\cap i$ the whole day.                                                                 |
| 4          | 140.0                 |       | S.                                | Cloudless till 6 A. M. scattered $\cap i$ till 3 P. M. Cloudless afterwards.                                        |
| 5 Sunday.  | 0.29                  |       |                                   |                                                                                                                     |
| 6          | ..                    | ..    | S. or E. or N.                    | Scattered $\backslash i$ till 6 A. M. cloudy afterwards, also drizzling at 4 & 6 P. M.                              |
| 7          | ..                    | 0.28  | N. or N. E.                       | Cloudy and constantly drizzling.                                                                                    |
| 8          | 109.0                 | 0.33  | N. or N. W.                       | Cloudy till 6 P. M. and constantly drizzling before sun rise. Cloudless from 7 P. M. to midnight.                   |
| 9          | 137.0                 |       | N. W.                             | Cloudless till 7 A. M. scattered $\backslash i$ till 6 P. M. Cloudless afterwards.                                  |
| 10         | 137.0                 |       | N. W.                             | Cloudless the whole day.                                                                                            |
| 11         | 136.0                 |       | N. W. or W.                       | Ditto.                                                                                                              |
| 12 Sunday. |                       |       |                                   |                                                                                                                     |
| 13         | 139.0                 |       | W. or N. W.                       | Ditto. [afterwards.                                                                                                 |
| 14         | 140.2                 |       | N. W.                             | Scattered $\backslash i$ or $\cap i$ till 4 P. M. Cloudless                                                         |
| 15         | 140.0                 |       | N. W.                             | Scattered $\cap i$ till 4 P. M. Cloudless afterwards. [afterwards.                                                  |
| 16         | 136.0                 |       | N. W.                             | Cloudy more or less till 3 P. M. Cloudless                                                                          |
| 17         | 136.2                 |       | N. W.                             | Cloudless.                                                                                                          |
| 18         | 140.3                 |       | W. or N. W.                       | Ditto.                                                                                                              |
| 19 Sunday. |                       |       |                                   |                                                                                                                     |
| 20         | 136.0                 |       | W. or N. or N. W.                 | Ditto.                                                                                                              |
| 21         | 137.0                 |       | N. W. or N. high at 1 and 2 P. M. | Ditto.                                                                                                              |
| 22         | 135.0                 |       | N. or N. W.                       | Cloudless nearly the whole day.                                                                                     |
| 23         | 120.0                 |       | N. or N. W.                       | Ditto.                                                                                                              |
| 24         | 135.9                 |       | N. or N. W.                       | Cloudless till 6 A. M. scattered $\cap i$ till 5 P. M. Cloudless afterwards.                                        |
| 25         | 139.0                 |       | N. W. or N.                       | Cloudless till 4 A. M. scattered $\backslash i$ till 7 P. M. Cloudless afterwards.                                  |
| 26 Sunday. |                       |       |                                   |                                                                                                                     |
| 27         | 140.0                 |       | Calm or N. W.                     | Cloudless till 8 A. M. Various kinds of clouds afterwards.                                                          |
| 28         | 142.4                 |       | N. W.                             | Cloudless till 5 A. M. scattered $\backslash i$ or $\cap i$ till 1 P. M. Cloudless afterwards.                      |
| 29         | 137.0                 |       | N. W.                             | Cloudless nearly the whole day.                                                                                     |
| 30         | 135.0                 |       | N. W.                             | Ditto.                                                                                                              |

$\cap i$  Cirri,  $\backslash i$  Cirro-strati,  $\cap i$  Cumuli,  $\cap i$  Cumulo-strati,  $\backslash i$  Nimbi,  $\neg i$  Strati,  
 $\backslash i$  Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1854.*

Latitude  $22^{\circ} 33' 1''$  North, Longitude  $88^{\circ} 20' 34''$  East.

Height of the Cistern of the Standard Barometer above the Level of the Sea 18.11. feet

Daily Means, &c. of the Observations, and of the Hygrometrical elements dependent thereon.

| Date. | Mean Height of the Barometer at $32^{\circ}$ Fahr. | Range of the Barometer during the day. |                   |                  | Mean Dry Bulb Thermometer. | Range of the Temperature during the day. |           |           |
|-------|----------------------------------------------------|----------------------------------------|-------------------|------------------|----------------------------|------------------------------------------|-----------|-----------|
|       |                                                    | Max.                                   | Min.              | Diff.            |                            | Max.                                     | Min.      | Diff.     |
| 1     | Inches.<br>30.053                                  | Inches.<br>30.144                      | Inches.<br>29.987 | Inches.<br>0.157 | °<br>72.5                  | °<br>79.9                                | °<br>65.8 | °<br>14.1 |
| 2     | .029                                               | .108                                   | .967              | .141             | 72.8                       | 81.0                                     | 66.5      | 14.5      |
| 3     | Sunday.                                            |                                        |                   |                  |                            |                                          |           |           |
| 4     | .032                                               | .100                                   | .995              | .105             | 72.8                       | 81.2                                     | 67.5      | 13.7      |
| 5     | .066                                               | .134                                   | 30.017            | .117             | 71.9                       | 79.2                                     | 65.4      | 13.8      |
| 6     | .054                                               | .140                                   | .002              | .138             | 69.6                       | 77.4                                     | 63.0      | 14.4      |
| 7     | .011                                               | .082                                   | 29.952            | .130             | 68.2                       | 72.0                                     | 64.9      | 7.1       |
| 8     | .000                                               | .051                                   | .966              | .085             | 69.6                       | 76.5                                     | 68.8      | 12.7      |
| 9     | .018                                               | .104                                   | .963              | .141             | 72.0                       | 80.2                                     | 67.4      | 12.8      |
| 10    | Sunday.                                            |                                        |                   |                  |                            |                                          |           |           |
| 11    | .098                                               | .173                                   | 30.048            | .125             | 69.4                       | 77.8                                     | 63.0      | 14.8      |
| 12    | .105                                               | .189                                   | .039              | .150             | 69.1                       | 78.4                                     | 61.8      | 16.6      |
| 13    | .109                                               | .187                                   | .065              | .122             | 68.5                       | 78.0                                     | 60.8      | 17.2      |
| 14    | .070                                               | .157                                   | 29.993            | .164             | 68.3                       | 77.0                                     | 61.2      | 15.8      |
| 15    | .005                                               | .075                                   | .925              | .150             | 68.5                       | 78.0                                     | 61.2      | 16.8      |
| 16    | 29.986                                             | .066                                   | .937              | .129             | 68.3                       | 76.4                                     | 61.6      | 14.8      |
| 17    | Sunday.                                            |                                        |                   |                  |                            |                                          |           |           |
| 18    | 30.044                                             | .120                                   | .987              | .133             | 65.9                       | 75.2                                     | 58.9      | 16.3      |
| 19    | 29.998                                             | .088                                   | .921              | .167             | 67.0                       | 76.4                                     | 59.7      | 16.7      |
| 20    | 30.016                                             | .094                                   | .965              | .129             | 66.5                       | 76.0                                     | 58.4      | 17.6      |
| 21    | .027                                               | .106                                   | .979              | .127             | 68.1                       | 77.6                                     | 60.6      | 17.0      |
| 22    | .023                                               | .090                                   | .961              | .129             | 68.9                       | 78.4                                     | 60.4      | 18.0      |
| 23    | .010                                               | .094                                   | .947              | .147             | 68.3                       | 76.0                                     | 60.8      | 15.2      |
| 24    | Sunday.                                            |                                        |                   |                  |                            |                                          |           |           |
| 25    | christmas                                          |                                        |                   |                  |                            |                                          |           |           |
| 26    | 29.995                                             | .090                                   | .943              | .147             | 66.7                       | 72.0                                     | 64.4      | 7.6       |
| 27    | 30.014                                             | .102                                   | .960              | .142             | 67.9                       | 78.2                                     | 60.3      | 17.9      |
| 28    | .004                                               | .088                                   | .939              | .149             | 67.1                       | 77.0                                     | 59.4      | 17.6      |
| 29    | 29.988                                             | .067                                   | .925              | .142             | 66.7                       | 76.2                                     | 59.2      | 17.0      |
| 30    | 30.019                                             | .110                                   | .965              | .145             | 66.5                       | 77.4                                     | 58.8      | 18.6      |
| 31    | Sunday.                                            |                                        |                   |                  |                            |                                          |           |           |



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of December, 1854.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.          | Mean Height of the Barometer at 32° Fahr.<br>Inches. | Range of the Barometer for<br>each hour during<br>the Month. |        |        | Mean Dry Bulb Thermo-<br>meter.<br>° | Range of the<br>Temperature for each<br>hour during the<br>month. |      |       |
|----------------|------------------------------------------------------|--------------------------------------------------------------|--------|--------|--------------------------------------|-------------------------------------------------------------------|------|-------|
|                |                                                      | Max.                                                         | Min.   | Diff.  |                                      | Max.                                                              | Min. | Diff. |
| Mid-<br>night. | 30.034                                               | 30.111                                                       | 29.980 | .031   | 65.4                                 | 69.7                                                              | 61.6 | 8.1   |
|                |                                                      | .027                                                         | .105   | .974   | 64.8                                 | 69.0                                                              | 61.0 | 8.0   |
|                |                                                      | .017                                                         | .104   | .957   | 64.3                                 | 68.5                                                              | 60.9 | 7.6   |
|                |                                                      | .010                                                         | .096   | .949   | 63.6                                 | 68.2                                                              | 60.5 | 7.7   |
|                |                                                      | .011                                                         | .077   | .943   | 63.4                                 | 67.9                                                              | 60.0 | 7.9   |
|                |                                                      | .018                                                         | .088   | .948   | 62.8                                 | 68.0                                                              | 59.0 | 9.0   |
|                |                                                      | .032                                                         | .107   | .967   | 62.5                                 | 67.8                                                              | 58.8 | 9.0   |
|                |                                                      | .057                                                         | .150   | .997   | 62.2                                 | 67.5                                                              | 58.4 | 9.1   |
|                |                                                      | .086                                                         | .172   | 30.033 | 65.0                                 | 70.8                                                              | 60.6 | 10.2  |
|                |                                                      | .107                                                         | .189   | .047   | 68.0                                 | 73.9                                                              | 63.6 | 10.3  |
|                |                                                      | .107                                                         | .187   | .051   | 70.5                                 | 75.6                                                              | 66.2 | 9.4   |
|                |                                                      | .088                                                         | .177   | .041   | 73.0                                 | 77.7                                                              | 66.8 | 10.9  |
| Noon.          | 29.994                                               | .052                                                         | .131   | .001   | .130                                 | 75.1                                                              | 79.8 | 66.0  |
|                |                                                      | .017                                                         | .100   | 29.970 | .130                                 | 76.2                                                              | 79.8 | 67.6  |
|                |                                                      | .072                                                         | .947   | .125   | 77.1                                 | 81.2                                                              | 70.4 | 10.8  |
|                |                                                      | .065                                                         | .930   | .135   | 77.1                                 | 80.4                                                              | 71.6 | 8.8   |
|                |                                                      | .068                                                         | .921   | .147   | 75.0                                 | 78.5                                                              | 71.0 | 7.5   |
|                |                                                      | .078                                                         | .930   | .143   | 73.7                                 | 76.8                                                              | 70.4 | 6.4   |
|                |                                                      | .085                                                         | .936   | .149   | 71.8                                 | 75.5                                                              | 68.6 | 6.9   |
|                |                                                      | .095                                                         | .958   | .137   | 70.2                                 | 74.3                                                              | 67.4 | 6.9   |
|                |                                                      | .111                                                         | .956   | .155   | 68.9                                 | 73.0                                                              | 65.7 | 7.3   |
|                |                                                      | .127                                                         | .914   | .213   | 67.8                                 | 72.2                                                              | 63.4 | 8.8   |
|                |                                                      | .133                                                         | .989   | .144   | 66.9                                 | 71.7                                                              | 61.6 | 10.1  |
|                |                                                      | .132                                                         | .985   | .147   | 66.1                                 | 70.2                                                              | 61.4 | 8.8   |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of December, 1854.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.     | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Point. | Bulb above Dew | Elastic force of Vapour. | Mean Weight of Vapour in a Cubic foot of Air. | Additional Weight of Vapour required for complete saturation. | Mean degree of Humidity complete saturation being unity. |
|-----------|----------------------------|---------------------|---------------------|------------|----------------|--------------------------|-----------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------|
|           | o                          | o                   | o                   | Inches.    | T. gr.         | T. gr.                   |                                               |                                                               |                                                          |
| Midnight. | 63.2                       | 2.2                 | 61.9                | 3.5        | .557           | 6.18                     | 0.77                                          | 0.889                                                         |                                                          |
| 1         | 62.7                       | 2.1                 | 61.4                | 3.4        | .548           | .10                      | .73                                           | .893                                                          |                                                          |
| 2         | 62.4                       | 1.9                 | 61.1                | 3.2        | .543           | .04                      | .68                                           | .899                                                          |                                                          |
| 3         | 61.6                       | 2.0                 | 60.2                | 3.4        | .527           | 5.87                     | .70                                           | .893                                                          |                                                          |
| 4         | 61.5                       | 1.9                 | 60.2                | 3.2        | .527           | .87                      | .66                                           | .899                                                          |                                                          |
| 5         | 61.1                       | 1.7                 | 59.9                | 2.9        | .521           | .81                      | .60                                           | .906                                                          |                                                          |
| 6         | 60.7                       | 1.8                 | 59.4                | 3.1        | .513           | .73                      | .62                                           | .902                                                          |                                                          |
| 7         | 60.6                       | 1.6                 | 59.5                | 2.7        | .515           | .75                      | .54                                           | .914                                                          |                                                          |
| 8         | 62.4                       | 2.6                 | 60.8                | 4.2        | .537           | .97                      | .90                                           | .869                                                          |                                                          |
| 9         | 64.2                       | 3.8                 | 61.9                | 6.1        | .557           | 6.16                     | 1.37                                          | .818                                                          |                                                          |
| 10        | 65.5                       | 5.0                 | 63.0                | 7.5        | .578           | .35                      | .78                                           | .781                                                          |                                                          |
| 11        | 66.9                       | 6.1                 | 63.8                | 9.2        | .593           | .49                      | 2.27                                          | .741                                                          |                                                          |
|           |                            |                     |                     |            |                |                          |                                               |                                                               |                                                          |
| Noon.     | 67.8                       | 7.3                 | 64.1                | 11.0       | .599           | .52                      | .82                                           | .698                                                          |                                                          |
| 1         | 68.2                       | 8.0                 | 64.2                | 12.0       | .601           | .53                      | 3.13                                          | .676                                                          |                                                          |
| 2         | 68.6                       | 8.5                 | 64.3                | 12.8       | .603           | .55                      | .37                                           | .660                                                          |                                                          |
| 3         | 68.6                       | 8.5                 | 64.3                | 12.8       | .603           | .55                      | .37                                           | .660                                                          |                                                          |
| 4         | 67.5                       | 7.5                 | 63.7                | 11.3       | .591           | .45                      | .86                                           | .693                                                          |                                                          |
| 5         | 67.5                       | 6.2                 | 64.4                | 9.3        | .605           | .62                      | 2.34                                          | .739                                                          |                                                          |
| 6         | 67.2                       | 4.6                 | 64.9                | 6.9        | .615           | .75                      | 1.70                                          | .799                                                          |                                                          |
| 7         | 66.6                       | 3.6                 | 64.8                | 5.4        | .613           | .76                      | .29                                           | .840                                                          |                                                          |
| 8         | 65.9                       | 3.0                 | 64.4                | 4.5        | .605           | .67                      | .07                                           | .862                                                          |                                                          |
| 9         | 65.1                       | 2.7                 | 63.5                | 4.3        | .588           | .50                      | 0.98                                          | .869                                                          |                                                          |
| 10        | 64.4                       | 2.5                 | 62.9                | 4.0        | .576           | .38                      | .90                                           | .876                                                          |                                                          |
| 11        | 63.8                       | 2.3                 | 62.4                | 3.7        | .567           | .28                      | .82                                           | .885                                                          |                                                          |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of December, 1854.*

Solar radiation, Weather, &amp;c.

| Date. | Max. Solar radiation. | Rain.<br>Inches. | Prevailing direction of the Wind. | General Aspect of the sky.                                                                             |
|-------|-----------------------|------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------|
| 1     | 130.0                 | o                | N. W. or N.                       | Cloudless till 6 A. M. scattered $\wedge i$ or other clouds afterwards.                                |
| 2     | 136.0                 |                  | Calm or N. E. or N. W. or N.      | Cloudless till 10 A. M. scattered $\wedge i$ till 3 P. M. cloudless afterwards and foggy after sunset. |
| 3     | Sunday.               |                  | N. or N. W.                       | Scattered $\wedge i$ till 10 A. M. nearly cloudless afterwards.                                        |
| 4     | 136.0                 |                  | N. or N. W.                       | Cloudless till 5 P. M. scattered $\wedge i$ afterwards.                                                |
| 5     | 137.2                 |                  | N. or N. W.                       | Cloudless till 9 A. M. scattered $\wedge i$ till 7 P. M. cloudless afterwards.                         |
| 6     | 129.7                 |                  | N. W. or N.                       | Various clouds.                                                                                        |
| 7     | ..                    |                  | W. or N. or N. W.                 | Scattered $\wedge i$ or cloudy the whole day.                                                          |
| 8     | ..                    |                  | N. W. or calm.                    | Cloudy till 10 A. M. cloudless afterwards.                                                             |
| 9     | 138.0                 |                  | W. or N.                          |                                                                                                        |
| 10    | Sunday.               |                  |                                   |                                                                                                        |
| 11    | 135.6                 |                  | N. or N. W.                       | Cloudless.                                                                                             |
| 12    | 134.9                 |                  | N. W.                             | Ditto.                                                                                                 |
| 13    | 135.0                 |                  | N. W.                             | Ditto.                                                                                                 |
| 14    | 134.8                 |                  | W. or N. W.                       | Ditto.                                                                                                 |
| 15    | 131.0                 |                  | N. W.                             | Cloudless till Noon scattered $\wedge i$ or $\vee i$ till 8 P. M. cloudless afterwards.                |
| 16    | 132.0                 |                  | N. W. or W.                       | Cloudless till 5 P. M. scattered $\wedge i$ till 7 P. M. cloudless afterwards.                         |
| 17    | Sunday.               |                  |                                   |                                                                                                        |
| 18    | 125.0                 |                  | N. W.                             | Cloudless.                                                                                             |
| 19    | 133.8                 |                  | N. W.                             | Cloudless till Noon scattered $\wedge i$ till 7 P. M. cloudless afterwards.                            |
| 20    | 133.0                 |                  | Calm or N. W.                     | Cloudless till 6 A. M. scattered $\wedge i$ till 6 P. M. cloudless afterwards and also foggy.          |
| 21    | 132.0                 |                  | N. W. or N.                       | Cloudless.                                                                                             |
| 22    | 137.0                 |                  | N.                                | Ditto.                                                                                                 |
| 23    | 127.0                 |                  | N. or N. W.                       | Cloudless till 7 A. M. scattered $\wedge i$ or $\vee i$ afterwards.                                    |
| 24    | Sunday.               |                  |                                   |                                                                                                        |
| 25    | Christ-mas.           |                  |                                   |                                                                                                        |
| 26    | ..                    |                  | W. or N. W.                       | Cloudy till 3 P. M. and drizzling at Noon cloudless afterwards.                                        |
| 27    | 137.0                 |                  | N. W. or N.                       | Cloudless.                                                                                             |
| 28    | 135.5                 |                  | N. or N. W.                       | Ditto.                                                                                                 |
| 29    | 131.0                 |                  | Calm or N. W.                     | Ditto.                                                                                                 |
| 30    | 139.0                 |                  | W. or N. or N. W.                 | Ditto.                                                                                                 |
| 31    | Sunday.               |                  |                                   |                                                                                                        |

$\wedge i$  Cirri,  $\vee i$  Cirro-strati,  $\wedge i$  Cumuli,  $\wedge i$  Cumulo-strati,  $\wedge i$  Nimbi,  $\wedge i$  Stratii,  
 $\wedge i$  Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of January, 1855.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

Height of the cistern of the Standard Barometer above the level of the Sea, 18.11. feet

Daily Means, &c., of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at $32^{\circ}$ Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer.<br>° | Range of the Tem-<br>perature during<br>the day. |      |       |  |
|-------|----------------------------------------------------------|-------------------------------------------|---------|---------|------------------------------------|--------------------------------------------------|------|-------|--|
|       |                                                          | Max.                                      | Min.    | Diff.   |                                    | Max.                                             | Min. | Diff. |  |
|       |                                                          |                                           |         |         |                                    |                                                  |      |       |  |
|       |                                                          | Inches.                                   | Inches. | Inches. | o                                  | o                                                | o    | o     |  |
| 1     | New year's day.                                          |                                           |         |         |                                    |                                                  |      |       |  |
| 2     | 29.986                                                   | .30.066                                   | .29.924 | .0.142  | 66.2                               | 76.6                                             | 58.4 | 18.2  |  |
| 3     | 30.002                                                   | .080                                      | .953    | .127    | 65.8                               | 73.6                                             | 59.2 | 14.4  |  |
| 4     | .016                                                     | .100                                      | .960    | .140    | 68.3                               | 77.6                                             | 62.6 | 15.0  |  |
| 5     | .028                                                     | .115                                      | .968    | .147    | 68.8                               | 78.8                                             | 61.6 | 17.2  |  |
| 6     | 29.975                                                   | .075                                      | .888    | .187    | 70.2                               | 77.8                                             | 63.8 | 14.0  |  |
| 7     | Sunday.                                                  |                                           |         |         |                                    |                                                  |      |       |  |
| 8     | .881                                                     | .29.937                                   | .846    | .091    | 66.3                               | 71.2                                             | 62.7 | 8.5   |  |
| 9     | .915                                                     | .989                                      | .864    | .125    | 66.6                               | 76.0                                             | 59.0 | 17.0  |  |
| 10    | .875                                                     | .959                                      | .802    | .157    | 69.5                               | 79.6                                             | 60.4 | 19.2  |  |
| 11    | .893                                                     | .993                                      | .836    | .157    | 69.6                               | 75.7                                             | 65.0 | 10.7  |  |
| 12    | .950                                                     | .30.019                                   | .912    | .107    | 68.3                               | 76.6                                             | 61.6 | 15.0  |  |
| 13    | .960                                                     | .044                                      | .907    | .137    | 67.4                               | 75.4                                             | 60.4 | 15.0  |  |
| 14    | Sunday.                                                  |                                           |         |         |                                    |                                                  |      |       |  |
| 15    | 30.035                                                   | .118                                      | .954    | .164    | 66.8                               | 75.2                                             | 61.4 | 13.8  |  |
| 16    | .065                                                     | .157                                      | .30.011 | .146    | 64.3                               | 74.8                                             | 55.8 | 19.0  |  |
| 17    | .066                                                     | .152                                      | .017    | .135    | 64.6                               | 75.2                                             | 55.7 | 19.5  |  |
| 18    | .046                                                     | .125                                      | .006    | .119    | 65.9                               | 76.3                                             | 57.0 | 19.3  |  |
| 19    | .073                                                     | .155                                      | .020    | .135    | 68.9                               | 77.0                                             | 62.6 | 14.4  |  |
| 20    | .117                                                     | .219                                      | .070    | .149    | 65.1                               | 74.0                                             | 58.8 | 15.2  |  |
| 21    | Sunday.                                                  |                                           |         |         |                                    |                                                  |      |       |  |
| 22    | .029                                                     | .112                                      | .29.954 | .158    | 61.4                               | 72.8                                             | 52.2 | 20.6  |  |
| 23    | .036                                                     | .127                                      | .981    | .146    | 63.0                               | 73.8                                             | 54.4 | 19.4  |  |
| 24    | .042                                                     | .132                                      | .966    | .166    | 62.6                               | 73.8                                             | 53.7 | 20.1  |  |
| 25    | 29.994                                                   | .067                                      | .917    | .150    | 64.5                               | 75.8                                             | 55.0 | 20.8  |  |
| 26    | 30.024                                                   | .092                                      | .966    | .126    | 66.7                               | 78.6                                             | 55.8 | 22.8  |  |
| 27    | .058                                                     | .143                                      | .988    | .155    | 68.9                               | 79.8                                             | 59.4 | 20.4  |  |
| 28    | Sunday.                                                  |                                           |         |         |                                    |                                                  |      |       |  |
| 29    | .105                                                     | .180                                      | .30.046 | .134    | 67.8                               | 77.8                                             | 59.0 | 18.8  |  |
| 30    | .153                                                     | .249                                      | .081    | .168    | 66.1                               | 77.2                                             | 57.0 | 20.2  |  |
| 31    | .138                                                     | .221                                      | .076    | .145    | 65.3                               | 76.4                                             | 56.0 | 20.4  |  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of January, 1855.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Date. | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a cubic foot of air. | Additional weight of Vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|-------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
| 1     | New year's day.            | o                   | o                   | o                         | Inches.                       | T. gr.                                        | T. gr.                                                        |                                                           |
| 2     | 62.5                       | 3.7                 | 60.3                | 5.9                       | 0.528                         | 5.86                                          | 1.26                                                          | .823                                                      |
| 3     | 62.0                       | 3.8                 | 59.7                | 6.1                       | .518                          | .75                                           | .29                                                           | .817                                                      |
| 4     | 63.8                       | 4.5                 | 61.1                | 7.2                       | .543                          | .99                                           | .61                                                           | .788                                                      |
| 5     | 65.4                       | 3.4                 | 63.7                | 5.1                       | .591                          | 6.52                                          | .19                                                           | .846                                                      |
| 6     | 66.2                       | 4.0                 | 64.2                | 6.0                       | .601                          | .61                                           | .44                                                           | .821                                                      |
| 7     | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 8     | 64.5                       | 1.8                 | 63.4                | 2.9                       | .586                          | .49                                           | 0.66                                                          | .908                                                      |
| 9     | 63.6                       | 3.0                 | 61.8                | 4.8                       | .555                          | .15                                           | 1.06                                                          | .853                                                      |
| 10    | 66.3                       | 3.2                 | 64.7                | 4.8                       | .611                          | .73                                           | .15                                                           | .854                                                      |
| 11    | 65.5                       | 4.1                 | 63.4                | 6.2                       | .586                          | .45                                           | .45                                                           | .816                                                      |
| 12    | 63.0                       | 5.3                 | 59.8                | 8.5                       | .520                          | 5.73                                          | .87                                                           | .754                                                      |
| 13    | 62.2                       | 5.2                 | 59.1                | 8.3                       | .508                          | .62                                           | .77                                                           | .760                                                      |
| 14    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 15    | 61.9                       | 4.9                 | 59.0                | 7.8                       | .506                          | .60                                           | .66                                                           | .771                                                      |
| 16    | 58.8                       | 5.5                 | 54.9                | 9.4                       | .441                          | 4.91                                          | .81                                                           | .731                                                      |
| 17    | 58.9                       | 5.7                 | 55.5                | 9.1                       | .450                          | 5.01                                          | .77                                                           | .739                                                      |
| 18    | 60.2                       | 5.7                 | 56.8                | 9.1                       | .470                          | .21                                           | .85                                                           | .738                                                      |
| 19    | 63.1                       | 5.8                 | 60.2                | 8.7                       | .527                          | .80                                           | .94                                                           | .749                                                      |
| 20    | 58.7                       | 6.4                 | 54.9                | 10.2                      | .441                          | 4.90                                          | .99                                                           | .711                                                      |
| 21    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 22    | 56.0                       | 5.4                 | 51.7                | 9.7                       | .396                          | .43                                           | .71                                                           | .721                                                      |
| 23    | 57.1                       | 5.9                 | 53.0                | 10.0                      | .414                          | .62                                           | .83                                                           | .716                                                      |
| 24    | 58.0                       | 4.6                 | 54.8                | 7.8                       | .440                          | .90                                           | .47                                                           | .769                                                      |
| 25    | 59.3                       | 5.2                 | 56.2                | 8.3                       | .461                          | 5.13                                          | .63                                                           | .759                                                      |
| 26    | 61.3                       | 5.4                 | 58.1                | 8.6                       | .491                          | .43                                           | .80                                                           | .751                                                      |
| 27    | 63.4                       | 5.5                 | 60.6                | 8.3                       | .534                          | .88                                           | .86                                                           | .760                                                      |
| 28    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 29    | 61.6                       | 6.2                 | 57.9                | 9.9                       | .488                          | .38                                           | 2.10                                                          | .719                                                      |
| 30    | 59.6                       | 6.5                 | 55.7                | 10.4                      | .453                          | .03                                           | .07                                                           | .708                                                      |
| 31    | 59.8                       | 5.5                 | 56.5                | 8.8                       | .465                          | .17                                           | 1.76                                                          | .746                                                      |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
month of January, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.     | Mean Height of the Barometer at 32° Fahr.<br>Inches. | Range of the Barometer for each hour during the month. |        |       | Mean Dry Bulb Thermometer.<br>° | Range of the Temperature for each hour during the month. |      |       |  |
|-----------|------------------------------------------------------|--------------------------------------------------------|--------|-------|---------------------------------|----------------------------------------------------------|------|-------|--|
|           |                                                      | Max.                                                   | Min.   | Diff. |                                 | Max.                                                     | Min. | Diff. |  |
|           |                                                      |                                                        |        |       |                                 |                                                          |      |       |  |
| Midnight. | 30.015                                               | 30.162                                                 | 29.849 | 0.313 | 62.8                            | 70.4                                                     | 56.6 | 13.8  |  |
| 1         | .008                                                 | .159                                                   | .847   | .312  | 62.1                            | 70.4                                                     | 56.0 | 14.4  |  |
| 2         | 29.999                                               | .152                                                   | .839   | .313  | 61.5                            | 70.0                                                     | 55.3 | 14.7  |  |
| 3         | .989                                                 | .143                                                   | .836   | .307  | 60.8                            | 69.4                                                     | 54.4 | 15.0  |  |
| 4         | .986                                                 | .134                                                   | .844   | .290  | 60.2                            | 68.2                                                     | 53.6 | 14.6  |  |
| 5         | .995                                                 | .145                                                   | .852   | .293  | 59.6                            | 66.1                                                     | 53.0 | 13.1  |  |
| 6         | 30.011                                               | .151                                                   | .864   | .287  | 59.3                            | 65.8                                                     | 52.4 | 13.4  |  |
| 7         | .036                                                 | .165                                                   | .889   | .276  | 59.0                            | 65.0                                                     | 52.2 | 12.8  |  |
| 8         | .066                                                 | .200                                                   | .910   | .290  | 61.0                            | 65.2                                                     | 55.0 | 10.2  |  |
| 9         | .092                                                 | .231                                                   | .935   | .296  | 64.6                            | 68.9                                                     | 59.8 | 9.1   |  |
| 10        | .100                                                 | .249                                                   | .937   | .312  | 67.9                            | 72.0                                                     | 61.8 | 10.2  |  |
| 11        | .086                                                 | .232                                                   | .931   | .301  | 70.7                            | 74.6                                                     | 65.0 | 9.6   |  |
|           |                                                      |                                                        |        |       |                                 |                                                          |      |       |  |
| Noon.     | .055                                                 | .202                                                   | .889   | .313  | 73.2                            | 76.8                                                     | 68.8 | 8.0   |  |
| 1         | .019                                                 | .166                                                   | .849   | .317  | 74.7                            | 78.6                                                     | 70.6 | 8.0   |  |
| 2         | 29.993                                               | .134                                                   | .833   | .301  | 75.6                            | 79.4                                                     | 70.8 | 8.6   |  |
| 3         | .975                                                 | .098                                                   | .808   | .290  | 75.8                            | 79.8                                                     | 71.2 | 8.6   |  |
| 4         | .965                                                 | .091                                                   | .802   | .289  | 74.0                            | 78.0                                                     | 70.2 | 7.8   |  |
| 5         | .969                                                 | .084                                                   | .812   | .272  | 72.5                            | 76.6                                                     | 69.8 | 6.8   |  |
| 6         | .975                                                 | .081                                                   | .821   | .260  | 70.3                            | 74.1                                                     | 66.6 | 7.5   |  |
| 7         | .992                                                 | .111                                                   | .829   | .282  | 68.6                            | 72.3                                                     | 64.2 | 8.1   |  |
| 8         | 30.010                                               | .128                                                   | .845   | .283  | 67.1                            | 71.4                                                     | 62.7 | 8.7   |  |
| 9         | .025                                                 | .145                                                   | .854   | .291  | 65.8                            | 70.8                                                     | 61.2 | 9.6   |  |
| 10        | .034                                                 | .151                                                   | .858   | .293  | 64.7                            | 70.6                                                     | 59.6 | 11.0  |  |
| 11        | .029                                                 | .158                                                   | .848   | .310  | 63.8                            | 70.5                                                     | 57.7 | 12.8  |  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in the  
Month of January, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a Cubic foot of Air. | Additional weight of vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|------------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
| Mid-night. | o                          | o                   | o                   | o                         | Inches.                       | T. gr.                                        | T. gr.                                                        |                                                           |
|            | 60.5                       | 2.3                 | 58.9                | 3.9                       | .504                          | 5.62                                          | 0.79                                                          | 0.877                                                     |
| 1          | 60.0                       | 2.1                 | 58.5                | 3.6                       | .498                          | .56                                           | .71                                                           | .887                                                      |
| 2          | 59.5                       | 2.0                 | 58.1                | 3.4                       | .491                          | .50                                           | .66                                                           | .893                                                      |
| 3          | 58.8                       | 2.0                 | 57.2                | 3.6                       | .476                          | .33                                           | .69                                                           | .885                                                      |
| 4          | 58.1                       | 2.1                 | 56.4                | 3.8                       | .464                          | .20                                           | .71                                                           | .880                                                      |
| 5          | 57.7                       | 1.9                 | 56.2                | 3.4                       | .461                          | .18                                           | .62                                                           | .893                                                      |
| 6          | 57.4                       | 1.9                 | 55.9                | 3.4                       | .456                          | .13                                           | .61                                                           | .894                                                      |
| 7          | 56.9                       | 2.1                 | 55.2                | 3.8                       | .445                          | .01                                           | .68                                                           | .880                                                      |
| 8          | 58.4                       | 2.6                 | 56.3                | 4.7                       | .462                          | .18                                           | .88                                                           | .855                                                      |
| 9          | 60.1                       | 4.5                 | 57.4                | 7.2                       | .480                          | .33                                           | 1.45                                                          | .786                                                      |
| 10         | 61.6                       | 6.3                 | 57.8                | 10.1                      | .486                          | .37                                           | 2.14                                                          | .715                                                      |
| 11         | 62.9                       | 7.8                 | 59.0                | 11.7                      | .506                          | .55                                           | .63                                                           | .678                                                      |
|            |                            |                     |                     |                           |                               |                                               |                                                               |                                                           |
| Noon.      | 64.3                       | 8.9                 | 59.8                | 13.4                      | .520                          | .68                                           | 3.14                                                          | .644                                                      |
| 1          | 65.1                       | 9.6                 | 60.3                | 14.4                      | .528                          | .76                                           | .47                                                           | .624                                                      |
| 2          | 65.8                       | 9.8                 | 60.9                | 14.7                      | .539                          | .86                                           | .62                                                           | .618                                                      |
| 3          | 65.9                       | 9.9                 | 60.9                | 14.9                      | .539                          | .86                                           | .68                                                           | .614                                                      |
| 4          | 64.9                       | 9.1                 | 60.3                | 13.7                      | .528                          | .76                                           | .28                                                           | .637                                                      |
| 5          | 64.5                       | 8.0                 | 60.5                | 12.0                      | .532                          | .83                                           | 2.80                                                          | .676                                                      |
| 6          | 64.6                       | 5.7                 | 61.7                | 8.6                       | .554                          | 6.08                                          | .00                                                           | .752                                                      |
| 7          | 64.0                       | 4.6                 | 61.7                | 6.9                       | .554                          | .10                                           | 1.57                                                          | .795                                                      |
| 8          | 63.1                       | 4.0                 | 60.7                | 6.4                       | .536                          | 5.93                                          | .39                                                           | .810                                                      |
| 9          | 62.4                       | 3.4                 | 60.4                | 5.4                       | .530                          | .89                                           | .15                                                           | .837                                                      |
| 10         | 61.7                       | 3.0                 | 59.9                | 4.8                       | .521                          | .79                                           | .01                                                           | .851                                                      |
| 11         | 61.3                       | 2.5                 | 59.5                | 4.3                       | .515                          | .73                                           | 0.88                                                          | .867                                                      |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta, in  
the month of January, 1855.  
Solar radiation, Weather, &c.*

| Date.             | Max. Solar radiation. | Rain.   | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                  |
|-------------------|-----------------------|---------|-----------------------------------|---------------------------------------------------------------------------------------------|
| 1 New year's day. | o                     | Inches. |                                   |                                                                                             |
| 2                 | 134.0                 | ..      | N. or N. N. W. or N. W.           | Cloudless and fogs in the morning and evening. [afterwards.                                 |
| 3                 | 123.0                 | ..      | Calm or N. W.                     | Cloudless till 5 A. M. clear or less cloudy                                                 |
| 4                 | 137.2                 | ..      | N. or N. W. or S. W.              | Cloudy till 7 A. M. scattered \i afterwards. [afterwards.                                   |
| 5                 | 135.7                 | ..      | W. or S. W.                       | Various clouds till 10 A. M. cloudless                                                      |
| 6                 | 128.0                 | ..      | Calm or S. or S. E.               | Cloudless till 5 A. M. scattered \i or \i till 6 P. M. cloudy afterwards.                   |
| 7 Sunday.         |                       |         |                                   | [terwards.                                                                                  |
| 8                 | 111.0                 | 0.46    | S. E. or N. W.                    | Various clouds till 5 P. M. cloudless af-                                                   |
| 9                 | 134.8                 | ..      | W. or N. N. W. or N. W.           | Cloudless till 10 A. M. scattered \i till 4 P. M. cloudless afterwards.                     |
| 10                | 137.0                 | ..      | N. W. or S. or S. W.              | Cloudless till 9 A. M. scattered \i or \i till 3 P. M. cloudless afterwards.                |
| 11                | 131.0                 | ..      | N. W. or S. W.                    | Scattered \i till 11 A. M. cloudless af-                                                    |
| 12                | 135.0                 | ..      | Calm or N. W.                     | Scattered \i till 6 A. M. cloudless till 3 P. M. scattered clouds afterwards.               |
| 13                | 131.7                 | ..      | N. or N. E.                       | More or less cloudy the whole day.                                                          |
| 14 Sunday.        |                       |         |                                   |                                                                                             |
| 15                | 133.8                 | ..      | N. or N. W. or N. N. W.           | Various clouds till 11 A. M. cloudless afterwards.                                          |
| 16                | 133.0                 | ..      | N. or N. W.                       | Cloudless.                                                                                  |
| 17                | 134.0                 | ..      | N. W. or N. E. or N. N. W.        | Ditto.                                                                                      |
| 18                | 133.0                 | ..      | N.                                | Cloudless till 5 A. M. scattered \i till 10 A. M. cloudless till 2 P. M. cloudy afterwards. |
| 19                | 133.0                 | ..      | N. W.                             | Various clouds the whole day.                                                               |
| 20                | 134.0                 | ..      | N. or N. W.                       | Cloudless till 10 A. M. scattered \i and \i till 3 P. M. cloudless afterwards.              |
| 21 Sunday.        |                       |         |                                   |                                                                                             |
| 22                | 129.0                 | ..      | Calm or N. N. W. or W.            | Cloudless.                                                                                  |
| 23                | 133.0                 | ..      | W. or N. W.                       | Cloudless till Noon, scattered \i till 6 P. M. cloudless afterwards.                        |
| 24                | 131.0                 | ..      | N. W.                             | Cloudless till 5 A. M. scattered \i till 7 P. M. cloudless afterwards.                      |
| 25                | 129.8                 | ..      | W. or S. W.                       | Cloudless nearly the whole day. [night.                                                     |
| 26                | 135.0                 | ..      | Calm or S. W.                     | Cloudless and slightly foggy during the                                                     |
| 27                | 139.0                 | ..      | Calm or N. W. or S.               | Cloudless.                                                                                  |
| 28 Sunday.        |                       |         |                                   |                                                                                             |
| 29                | 136.2                 | ..      | W. or N. or N. W.                 | Cloudless till 7 A. M. scattered \i or \i till 3 P. M. cloudless afterwards. [day.          |
| 30                | 134.5                 | ..      | N. or W. or N. W.                 | Cloudless and slightly foggy during the                                                     |
| 31                | 131.5                 | ..      | W. or N. N. W. or N. W.           | Cloudless and slightly foggy in the morn- ing and evening.                                  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1855.*

Latitude  $22^{\circ} 33' 1''$  North, Longitude  $88^{\circ} 20' 34''$  East.

Height of the Cistern of the Standard Barometer above the Level of the Sea 18.11. feet

Daily Means, &c. of the Observations, and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of the Barometer at 32° Fahr. | Range of the Barometer during the day. |                   |                  | Bulb Thermometer. | Range of the Temperature during the day. |                  |           |
|-------|-------------------------------------------|----------------------------------------|-------------------|------------------|-------------------|------------------------------------------|------------------|-----------|
|       |                                           | Max.                                   | Min.              | Diff.            |                   | Mean                                     | Dry Thermometer. | Max.      |
| 1     | Inches.<br>30.110                         | Inches.<br>30.203                      | Inches.<br>30.046 | Inches.<br>0.157 | °<br>67.0         | °<br>78.6                                | °<br>56.6        | °<br>22.0 |
| 2     | .095                                      | .193                                   | .013              | .180             | 69.1              | 79.2                                     | 60.7             | 18.5      |
| 3     | .098                                      | .190                                   | .034              | .156             | 69.7              | 77.6                                     | 63.6             | 14.0      |
| 4     | Sunday.                                   |                                        |                   |                  |                   |                                          |                  |           |
| 5     | .068                                      | .139                                   | .010              | .129             | 71.0              | 79.0                                     | 63.4             | 15.6      |
| 6     | .178                                      | .264                                   | .121              | .143             | 69.9              | 79.2                                     | 61.7             | 17.5      |
| 7     | .176                                      | .266                                   | .115              | .151             | 70.8              | 79.0                                     | 64.4             | 14.6      |
| 8     | .046                                      | .138                                   | 29.960            | .178             | 70.4              | 79.6                                     | 62.4             | 17.2      |
| 9     | 29.981                                    | .053                                   | .925              | .128             | 72.5              | 82.2                                     | 64.0             | 18.2      |
| 10    | 30.040                                    | .126                                   | .995              | .131             | 74.1              | 83.8                                     | 68.3             | 15.5      |
| 11    | Sunday.                                   |                                        |                   |                  |                   |                                          |                  |           |
| 12    | 29.998                                    | .092                                   | .925              | .167             | 75.2              | 85.0                                     | 68.2             | 16.8      |
| 13    | .947                                      | .020                                   | .889              | .131             | 76.1              | 86.4                                     | 69.6             | 16.8      |
| 14    | .935                                      | .032                                   | .866              | .166             | 76.4              | 85.2                                     | 68.2             | 17.0      |
| 15    | .903                                      | 29.985                                 | .859              | .126             | 75.3              | 84.2                                     | 69.4             | 14.8      |
| 16    | .955                                      | 30.018                                 | .895              | .123             | 69.5              | 77.8                                     | 65.6             | 12.2      |
| 17    | .964                                      | .043                                   | .894              | .149             | 68.8              | 77.2                                     | 63.0             | 14.2      |
| 18    | Sunday.                                   |                                        |                   |                  |                   |                                          |                  |           |
| 19    | .873                                      | 29.935                                 | .790              | .145             | 71.0              | 76.8                                     | 66.6             | 10.2      |
| 20    | .889                                      | .965                                   | .823              | .142             | 71.8              | 79.6                                     | 65.6             | 14.0      |
| 21    | .982                                      | 30.072                                 | .937              | .135             | 71.5              | 80.2                                     | 64.0             | 16.2      |
| 22    | .942                                      | .030                                   | .872              | .158             | 72.1              | 81.0                                     | 62.8             | 18.2      |
| 23    | .918                                      | 29.991                                 | .861              | .130             | 74.5              | 82.4                                     | 67.8             | 14.6      |
| 24    | .962                                      | 30.029                                 | .908              | .121             | 75.4              | 84.2                                     | 68.8             | 15.4      |
| 25    | Sunday.                                   |                                        |                   |                  |                   |                                          |                  |           |
| 26    | 30.040                                    | .137                                   | .987              | .150             | 76.5              | 86.2                                     | 67.6             | 18.6      |
| 27    | .023                                      | .122                                   | .956              | .166             | 75.3              | 86.0                                     | 65.0             | 21.0      |
| 28    | .006                                      | .089                                   | .938              | .151             | 76.4              | 86.8                                     | 66.4             | 20.4      |

*Abstract of the Results of the Hourly Meteorological Observations,  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1855.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Date. | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Inches. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a Cubic foot of Air. | Additional weight of vapour required for complete saturation. | Mean degree of Humidity complete saturation being unity. |
|-------|----------------------------|---------------------|---------------------|---------------------------|---------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------|
| 1     | 61.4                       | 5.6                 | 58.0                | 9.0                       | 0.489   | 5.41                          | 1.89                                          | 0.741                                                         |                                                          |
| 2     | 65.5                       | 3.6                 | 63.7                | 5.4                       | .591    | 6.52                          | .26                                           | .838                                                          |                                                          |
| 3     | 66.7                       | 3.0                 | 65.2                | 4.5                       | .621    | .84                           | .09                                           | .863                                                          |                                                          |
| 4     | <i>Sunday.</i>             |                     |                     |                           |         |                               |                                               |                                                               |                                                          |
| 5     | 67.2                       | 3.8                 | 65.3                | 5.7                       | .623    | .85                           | .40                                           | .830                                                          |                                                          |
| 6     | 66.5                       | 3.4                 | 64.8                | 5.1                       | .613    | .76                           | .22                                           | .847                                                          |                                                          |
| 7     | 66.9                       | 3.9                 | 64.9                | 5.9                       | .615    | .77                           | .43                                           | .826                                                          |                                                          |
| 8     | 65.9                       | 4.5                 | 63.6                | 6.8                       | .590    | .48                           | .62                                           | .800                                                          |                                                          |
| 9     | 68.6                       | 3.9                 | 66.6                | 5.9                       | .651    | 7.12                          | .51                                           | .825                                                          |                                                          |
| 10    | 70.5                       | 3.6                 | 68.7                | 5.4                       | .697    | .61                           | .46                                           | .839                                                          |                                                          |
| 11    | <i>Sunday.</i>             |                     |                     |                           |         |                               |                                               |                                                               |                                                          |
| 12    | 70.5                       | 4.7                 | 68.1                | 7.1                       | .684    | .44                           | .93                                           | .794                                                          |                                                          |
| 13    | 71.4                       | 4.7                 | 69.0                | 7.1                       | .704    | .65                           | .98                                           | .794                                                          |                                                          |
| 14    | 70.8                       | 5.6                 | 68.0                | 8.4                       | .681    | .41                           | 2.31                                          | .762                                                          |                                                          |
| 15    | 68.3                       | 7.0                 | 64.8                | 10.5                      | .613    | 6.68                          | .72                                           | .711                                                          |                                                          |
| 16    | 64.8                       | 4.7                 | 62.4                | 7.1                       | .567    | .24                           | 1.64                                          | .792                                                          |                                                          |
| 17    | 65.1                       | 3.7                 | 63.2                | 5.6                       | .582    | .41                           | .30                                           | .831                                                          |                                                          |
| 18    | <i>Sunday.</i>             |                     |                     |                           |         |                               |                                               |                                                               |                                                          |
| 19    | 68.3                       | 2.7                 | 66.9                | 4.1                       | .657    | 7.22                          | .03                                           | .875                                                          |                                                          |
| 20    | 67.7                       | 4.1                 | 65.6                | 6.2                       | .630    | 6.92                          | .53                                           | .819                                                          |                                                          |
| 21    | 66.0                       | 5.5                 | 63.2                | 8.3                       | .582    | .39                           | .99                                           | .763                                                          |                                                          |
| 22    | 66.6                       | 5.5                 | 63.8                | 8.3                       | .593    | .50                           | 2.03                                          | .762                                                          |                                                          |
| 23    | 68.7                       | 5.8                 | 65.8                | 8.7                       | .634    | .91                           | .27                                           | .753                                                          |                                                          |
| 24    | 71.2                       | 4.2                 | 69.1                | 6.3                       | .706    | 7.69                          | 1.74                                          | .815                                                          |                                                          |
| 25    | <i>Sunday.</i>             |                     |                     |                           |         |                               |                                               |                                                               |                                                          |
| 26    | 69.1                       | 7.4                 | 65.4                | 11.1                      | .626    | 6.80                          | 2.95                                          | .697                                                          |                                                          |
| 27    | 67.0                       | 8.3                 | 62.8                | 12.5                      | .574    | .24                           | 3.16                                          | .664                                                          |                                                          |
| 28    | 68.1                       | 8.3                 | 63.9                | 12.5                      | .595    | .46                           | .26                                           | .665                                                          |                                                          |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Height of the Barometer at 32° Fahr. | Range of the Barometer for each hour during the Month. |         |         | Mean Dry Bulb Thermometer. | Range of the Temperature for each hour during the Month. |      |       |  |
|------------|-------------------------------------------|--------------------------------------------------------|---------|---------|----------------------------|----------------------------------------------------------|------|-------|--|
|            |                                           | Max.                                                   | Min.    | Diff.   |                            | Max.                                                     | Min. | Diff. |  |
|            |                                           |                                                        |         |         |                            |                                                          |      |       |  |
|            |                                           | Inches.                                                | Inches. | Inches. | o                          | o                                                        | o    | o     |  |
| Mid-night. | 30.006                                    | 30.205                                                 | 29.844  | .361    | 68.7                       | 73.0                                                     | 61.4 | 11.6  |  |
| 1          | 29.996                                    | .184                                                   | .840    | .344    | 68.1                       | 72.8                                                     | 60.4 | 12.4  |  |
| 2          | .986                                      | .186                                                   | .838    | .348    | 67.5                       | 72.8                                                     | 60.0 | 12.8  |  |
| 3          | .978                                      | .184                                                   | .828    | .356    | 67.2                       | 72.2                                                     | 59.4 | 12.8  |  |
| 4          | .972                                      | .173                                                   | .823    | .350    | 66.5                       | 71.8                                                     | 58.8 | 13.0  |  |
| 5          | .978                                      | .175                                                   | .836    | .339    | 66.1                       | 71.0                                                     | 58.0 | 13.0  |  |
| 6          | .999                                      | .199                                                   | .852    | .347    | 65.6                       | 70.2                                                     | 57.2 | 13.0  |  |
| 7          | 30.025                                    | .214                                                   | .888    | .326    | 65.3                       | 69.6                                                     | 56.6 | 13.0  |  |
| 8          | .056                                      | .240                                                   | .919    | .321    | 67.6                       | 72.6                                                     | 60.4 | 12.2  |  |
| 9          | .078                                      | .253                                                   | .902    | .351    | 70.6                       | 77.4                                                     | 64.6 | 12.8  |  |
| 10         | .087                                      | .266                                                   | .906    | .360    | 73.6                       | 79.9                                                     | 67.8 | 12.1  |  |
| 11         | .073                                      | .247                                                   | .923    | .324    | 76.1                       | 81.8                                                     | 69.3 | 12.5  |  |
|            |                                           |                                                        |         |         |                            |                                                          |      |       |  |
| Noon.      | .048                                      | .219                                                   | .904    | .315    | 78.4                       | 83.6                                                     | 69.6 | 14.0  |  |
| 1          | .014                                      | .183                                                   | .860    | .323    | 79.8                       | 85.4                                                     | 71.8 | 13.6  |  |
| 2          | 29.986                                    | .165                                                   | .836    | .329    | 80.8                       | 86.8                                                     | 74.8 | 12.0  |  |
| 3          | .965                                      | .145                                                   | .803    | .342    | 81.2                       | 86.8                                                     | 73.4 | 13.4  |  |
| 4          | .955                                      | .136                                                   | .793    | .343    | 80.6                       | 86.4                                                     | 69.0 | 17.4  |  |
| 5          | .950                                      | .131                                                   | .795    | .336    | 79.3                       | 85.4                                                     | 69.6 | 15.8  |  |
| 6          | .957                                      | .145                                                   | .790    | .355    | 76.5                       | 82.0                                                     | 68.5 | 13.5  |  |
| 7          | .976                                      | .181                                                   | .813    | .368    | 74.5                       | 78.8                                                     | 68.2 | 10.6  |  |
| 8          | .997                                      | .197                                                   | .837    | .360    | 73.0                       | 77.2                                                     | 68.0 | 9.2   |  |
| 9          | 30.011                                    | .207                                                   | .853    | .354    | 71.7                       | 75.0                                                     | 66.1 | 8.9   |  |
| 10         | .017                                      | .209                                                   | .865    | .344    | 70.8                       | 74.0                                                     | 65.6 | 8.4   |  |
| 11         | .014                                      | .210                                                   | .868    | .342    | 70.1                       | 73.5                                                     | 65.4 | 8.1   |  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Wet Bulb Thermo-meter. |      | Dry Bulb above Wet. |      | Computed Dew Point. |        | Dry Bulb above<br>Point. | Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a Cubic foot of Air. | Additional Weight of Va-pour required for com-plete saturation. | Mean degree of Humidity<br>complete saturation be-<br>ing unity. |
|------------|-----------------------------|------|---------------------|------|---------------------|--------|--------------------------|-----------------------------|--------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|
|            | o                           | o    | o                   | o    | Inches.             | T. gr. | T. gr.                   |                             |                                                  |                                                                 |                                                                  |
| Mid-night. | 66.3                        | 2.4  | 65.1                | 3.6  | 0.619               | 6.83   | 0.86                     |                             |                                                  |                                                                 | 0.888                                                            |
| 1          | 66.0                        | 2.1  | 64.7                | 3.4  | .611                | .76    | .79                      |                             |                                                  |                                                                 | .895                                                             |
| 2          | 65.6                        | 1.9  | 64.5                | 3.0  | .607                | .72    | .70                      |                             |                                                  |                                                                 | .906                                                             |
| 3          | 65.3                        | 1.9  | 64.2                | 3.0  | .601                | .65    | .70                      |                             |                                                  |                                                                 | .905                                                             |
| 4          | 64.6                        | 1.9  | 63.5                | 3.0  | .588                | .51    | .68                      |                             |                                                  |                                                                 | .905                                                             |
| 5          | 64.5                        | 1.6  | 63.5                | 2.6  | .588                | .51    | .59                      |                             |                                                  |                                                                 | .917                                                             |
| 6          | 64.1                        | 1.5  | 63.2                | 2.4  | .582                | .46    | .54                      |                             |                                                  |                                                                 | .923                                                             |
| 7          | 63.9                        | 1.4  | 63.1                | 2.2  | .580                | .44    | .49                      |                             |                                                  |                                                                 | .929                                                             |
| 8          | 65.3                        | 2.3  | 63.9                | 3.7  | .595                | .58    | .86                      |                             |                                                  |                                                                 | .884                                                             |
| 9          | 67.0                        | 3.6  | 65.2                | 5.4  | .621                | .84    | 1.31                     |                             |                                                  |                                                                 | .839                                                             |
| 10         | 68.5                        | 5.1  | 65.9                | 7.7  | .636                | .95    | .98                      |                             |                                                  |                                                                 | .778                                                             |
| 11         | 69.6                        | 6.5  | 66.3                | 9.8  | .644                | 7.01   | 2.62                     |                             |                                                  |                                                                 | .728                                                             |
|            |                             |      |                     |      |                     |        |                          |                             |                                                  |                                                                 |                                                                  |
| Noon.      | 70.4                        | 8.0  | 66.4                | 12.0 | .646                | .00    | 3.31                     |                             |                                                  |                                                                 | .679                                                             |
| 1          | 70.6                        | 9.2  | 66.0                | 13.8 | .638                | 6.88   | .87                      |                             |                                                  |                                                                 | .640                                                             |
| 2          | 70.7                        | 10.1 | 65.6                | 15.2 | .630                | .79    | 4.28                     |                             |                                                  |                                                                 | .613                                                             |
| 3          | 70.5                        | 10.7 | 65.1                | 16.1 | .619                | .67    | .54                      |                             |                                                  |                                                                 | .595                                                             |
| 4          | 70.0                        | 10.6 | 64.7                | 15.9 | .611                | .58    | .43                      |                             |                                                  |                                                                 | .598                                                             |
| 5          | 69.9                        | 9.4  | 65.2                | 14.1 | .621                | .72    | 3.87                     |                             |                                                  |                                                                 | .635                                                             |
| 6          | 69.5                        | 7.0  | 66.0                | 10.5 | .638                | .92    | 2.83                     |                             |                                                  |                                                                 | .710                                                             |
| 7          | 69.1                        | 5.4  | 66.4                | 8.1  | .646                | 7.06   | .12                      |                             |                                                  |                                                                 | .769                                                             |
| 8          | 68.5                        | 4.5  | 66.2                | 6.8  | .642                | .02    | 1.74                     |                             |                                                  |                                                                 | .801                                                             |
| 9          | 68.0                        | 3.7  | 66.1                | 5.6  | .640                | .01    | .42                      |                             |                                                  |                                                                 | .832                                                             |
| 10         | 67.8                        | 3.0  | 66.3                | 4.5  | .644                | .08    | .12                      |                             |                                                  |                                                                 | .863                                                             |
| 11         | 67.4                        | 2.7  | 66.0                | 4.1  | .638                | .02    | .01                      |                             |                                                  |                                                                 | .874                                                             |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1855.*

Solar radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain. | Prevailing direction of the Wind. | General Aspect of the sky.                                                                                                     |
|-------|-----------------------|-------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| 1     | 132.5                 |       | S. W. or W.                       | Cloudless and slightly foggy during the day.                                                                                   |
| 2     | 130.0                 |       | Calm or S.                        | Cloudless till 9 A. M. scattered $\wedge$ i afterwards.                                                                        |
| 3     | 132.5                 |       | S. or S. E.                       | Scattered $\wedge$ i or $\backslash$ i till 6 A. M. cloudless till 11 A. M. scattered $\wedge$ i or $\backslash$ i afterwards. |
| 4     | Sunday.               |       |                                   | More or less cloudy the whole day.                                                                                             |
| 5     | 128.2                 |       | E. or S.                          | Cloudy till 6 P. M. also rain, lightning and thunder between midnight and 8 A. M. cloudless after 6 P. M.                      |
| 6     | 134.0                 | 0.74  | E. or variable.                   | Cloudless nearly the whole day.                                                                                                |
| 7     | 130.0                 |       | N. E. or N. W.                    | Ditto.                                                                                                                         |
| 8     | 131.5                 |       | Calm or W. or S.                  | Cloudless till 6 A. M. various clouds till 5 P. M. cloudless afterwards.                                                       |
| 9     | 136.2                 |       | S. or S. E.                       | Cloudless till 2 A. M. various clouds till 6 P. M. cloudless afterwards.                                                       |
| 10    | 139.0                 |       | S.                                | Cloudless nearly the whole day.                                                                                                |
| 11    | Sunday.               |       | S. or S. W.                       | Cloudless till 7 A. M. scattered $\backslash$ i and $\wedge$ i afterwards.                                                     |
| 12    | 137.0                 |       | S.                                | Cloudy till 6 A. M. cloudless till 10 A. M. scattered $\wedge$ i and $\backslash$ i till 4 P. M. cloudless afterwards.         |
| 13    | 136.0                 |       | S. or S. W.                       | Cloudless till 6 A. M. scattered $\wedge$ i or $\backslash$ i till 3 P. M. cloudless afterwards.                               |
| 14    | 135.2                 |       | S. or S. W.                       | Cloudless till 5 A. M. cloudy afterwards, also drizzling between 4 and 5 P. M.                                                 |
| 15    | 135.2                 |       | S. W. or W.                       | Scattered $\wedge$ i till 8 A. M. cloudy afterwards with drizzling between 4 and 5 P. M.                                       |
| 16    | ..                    |       | Calm or W. or N. W.               | Cloudy and raining till 8 A. M. only cloudy 7 P. M. cloudless afterwards.                                                      |
| 17    | 115.0                 |       | W. or S. W.                       | Cloudless till 9 A. M. scattered $\wedge$ i till 6 P. M. cloudless afterwards.                                                 |
| 18    | Sunday.               |       |                                   | Cloudless till 5 A. M. various clouds afterwards.                                                                              |
| 19    | ..                    | 0.37  | W. or S. S. E. or S.              | Cloudless till 7 A. M. cloudy till Noon, scattered $\wedge$ i afterwards.                                                      |
| 20    | 134.0                 |       | S. or N. W.                       | Cloudless till 9 A. M. scattered $\wedge$ i till 7 P. M. cloudless afterwards.                                                 |
| 21    | 134.0                 |       | N. W. or W.                       | Cloudless till 9 A. M. scattered $\wedge$ i till 6 P. M. cloudless afterwards.                                                 |
| 22    | 132.0                 |       | S. W. or W.                       | Cloudless till 7 A. M. cloudy till Noon, scattered $\wedge$ i afterwards.                                                      |
| 23    | 138.0                 |       | S. W. or W. or S.                 | Cloudless till 5 A. M. scattered $\wedge$ i till 7 P. M. cloudless afterwards.                                                 |
| 24    | 136.0                 |       | S.                                | Cloudless till 9 A. M. scattered $\wedge$ i till 6 P. M. cloudless afterwards.                                                 |
| 25    | Sunday.               |       | S. or N. or W.                    | Cloudless.                                                                                                                     |
| 26    | 140.0                 |       | S. W. or N. W or S.               | Scattered $\wedge$ i.                                                                                                          |
| 27    | 140.2                 |       | S. or W. or N.                    | Scattered $\wedge$ i.                                                                                                          |
| 28    | 140.0                 |       |                                   | Scattered $\wedge$ i.                                                                                                          |

$\wedge$ i Cirri,  $\backslash$ i Cirro-strati,  $\wedge$ i Cumuli,  $\wedge$ i Cumulo-strati,  $\wedge$ i Nimbi,  $\wedge$ i Stratiformis,  $\wedge$ i Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1855.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

feet.

Height of the cistern of the Standard Barometer above the level of the Sea, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at $32^{\circ}$ Fault. | Range of the Barometer<br>during the day. |         |         | Bulb<br>Thermometer. | Range of the Tempe-<br>rature during<br>the day. |      |      |
|-------|-----------------------------------------------------------|-------------------------------------------|---------|---------|----------------------|--------------------------------------------------|------|------|
|       |                                                           | Max.                                      | Min.    | Diff.   |                      | Mean                                             | Dry  | Bulb |
|       | Inches.                                                   | Inches.                                   | Inches. | Inches. | o                    | o                                                | o    | o    |
| 1     | 29.984                                                    | 30.059                                    | 29.922  | .037    | 75.9                 | 87.7                                             | 65.4 | 22.3 |
| 2     | .972                                                      | .042                                      | .890    | .152    | 77.0                 | 86.9                                             | 67.2 | 19.7 |
| 3     | 30.057                                                    | .131                                      | .999    | .132    | 71.8                 | 74.2                                             | 69.2 | 5.0  |
| 4     | Sunday.                                                   |                                           |         |         |                      |                                                  |      |      |
| 5     | .019                                                      | .106                                      | .955    | .151    | 76.6                 | 86.7                                             | 67.8 | 18.9 |
| 6     | 29.991                                                    | .069                                      | .923    | .146    | 78.1                 | 85.9                                             | 70.8 | 15.1 |
| 7     | .972                                                      | .045                                      | .906    | .139    | 77.5                 | 88.0                                             | 70.5 | 17.5 |
| 8     | .893                                                      | 29.970                                    | .821    | .149    | 78.4                 | 89.4                                             | 68.0 | 21.4 |
| 9     | .854                                                      | .917                                      | .796    | .121    | 80.2                 | 91.0                                             | 72.5 | 18.5 |
| 10    | .849                                                      | .936                                      | .775    | .161    | 78.3                 | 87.8                                             | 70.6 | 17.2 |
| 11    | Sunday.                                                   |                                           |         |         |                      |                                                  |      |      |
| 12    | .960                                                      | 30.048                                    | .908    | .140    | 79.0                 | 87.8                                             | 70.8 | 17.0 |
| 13    | .961                                                      | .050                                      | .884    | .166    | 78.5                 | 88.4                                             | 68.6 | 19.8 |
| 14    | .863                                                      | 29.945                                    | .786    | .159    | 78.6                 | 89.2                                             | 69.8 | 19.4 |
| 15    | .801                                                      | .876                                      | .732    | .144    | 79.1                 | 87.1                                             | 72.8 | 14.3 |
| 16    | .887                                                      | .984                                      | .788    | .196    | 74.6                 | 82.6                                             | 70.4 | 12.2 |
| 17    | .940                                                      | 30.034                                    | .885    | .149    | 71.8                 | 79.7                                             | 67.4 | 12.3 |
| 18    | Sunday.                                                   |                                           |         |         |                      |                                                  |      |      |
| 19    | .885                                                      | 29.980                                    | .801    | .179    | 77.3                 | 88.7                                             | 66.2 | 22.5 |
| 20    | .796                                                      | .876                                      | .719    | .157    | 77.9                 | 89.2                                             | 67.2 | 22.0 |
| 21    | .738                                                      | .814                                      | .666    | .148    | 79.3                 | 91.2                                             | 66.9 | 24.3 |
| 22    | .761                                                      | .838                                      | .699    | .139    | 81.1                 | 91.6                                             | 71.8 | 19.8 |
| 23    | .788                                                      | .856                                      | .716    | .140    | 81.6                 | 90.6                                             | 75.2 | 15.4 |
| 24    | .804                                                      | .900                                      | .729    | .171    | 81.8                 | 91.6                                             | 74.8 | 16.8 |
| 25    | Sunday.                                                   |                                           |         |         |                      |                                                  |      |      |
| 26    | .810                                                      | .889                                      | .749    | .140    | 83.2                 | 93.5                                             | 76.2 | 17.3 |
| 27    | .818                                                      | .891                                      | .747    | .144    | 84.5                 | 94.4                                             | 76.2 | 18.2 |
| 28    | .817                                                      | .906                                      | .739    | .167    | 84.7                 | 95.3                                             | 77.4 | 17.9 |
| 29    | .799                                                      | .874                                      | .722    | .152    | 84.3                 | 96.4                                             | 75.6 | 20.8 |
| 30    | .767                                                      | .864                                      | .683    | .181    | 85.1                 | 96.7                                             | 77.4 | 19.3 |
| 31    | .760                                                      | .831                                      | .680    | .151    | 84.5                 | 94.0                                             | 79.8 | 14.2 |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1855.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Date. | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a cubic foot of air. | Additional weight of Vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|-------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
| 1     | 67.9                       | 8.0                 | 63.9                | 12.0                      | .595                          | 6.47                                          | 3.10                                                          | 0.676                                                     |
| 2     | 69.5                       | 7.5                 | 65.7                | 11.3                      | .632                          | .87                                           | .02                                                           | .695                                                      |
| 3     | 68.2                       | 3.6                 | 66.4                | 5.4                       | .646                          | 7.10                                          | 1.35                                                          | .840                                                      |
| 4     | <i>Sunday.</i>             |                     | o                   | o                         | Inches.                       | T. gr.                                        | T. gr.                                                        |                                                           |
| 5     | 70.8                       | 5.8                 | 67.9                | 8.7                       | .679                          | .37                                           | 2.40                                                          | .754                                                      |
| 6     | 72.4                       | 5.7                 | 69.5                | 8.6                       | .715                          | .74                                           | .48                                                           | .757                                                      |
| 7     | 71.7                       | 5.8                 | 68.8                | 8.7                       | .699                          | .57                                           | .47                                                           | .754                                                      |
| 8     | 71.0                       | 7.4                 | 67.3                | 11.1                      | .666                          | .21                                           | 3.10                                                          | .699                                                      |
| 9     | 74.4                       | 5.8                 | 71.5                | 8.7                       | .763                          | 8.23                                          | 2.65                                                          | .756                                                      |
| 10    | 72.0                       | 6.3                 | 68.8                | 9.5                       | .699                          | 7.56                                          | .72                                                           | .735                                                      |
| 11    | <i>Sunday.</i>             |                     | o                   | o                         |                               |                                               |                                                               |                                                           |
| 12    | 71.5                       | 7.5                 | 67.7                | 11.3                      | .674                          | .30                                           | 3.20                                                          | .695                                                      |
| 13    | 70.8                       | 7.7                 | 66.9                | 11.6                      | .657                          | .11                                           | .24                                                           | .687                                                      |
| 14    | 72.8                       | 5.8                 | 69.9                | 8.7                       | .725                          | .84                                           | 2.54                                                          | .755                                                      |
| 15    | 73.3                       | 5.8                 | 70.4                | 8.7                       | .736                          | .95                                           | .58                                                           | .755                                                      |
| 16    | 70.2                       | 4.4                 | 68.0                | 6.6                       | .681                          | .42                                           | 1.78                                                          | .807                                                      |
| 17    | 68.9                       | 2.9                 | 67.4                | 4.4                       | .668                          | .33                                           | .12                                                           | .867                                                      |
| 18    | <i>Sunday.</i>             |                     | o                   | o                         |                               |                                               |                                                               |                                                           |
| 19    | 68.3                       | 9.0                 | 63.8                | 13.5                      | .593                          | 6.42                                          | 3.56                                                          | .643                                                      |
| 20    | 68.3                       | 9.6                 | 63.5                | 14.4                      | .588                          | .37                                           | .79                                                           | .627                                                      |
| 21    | 69.5                       | 9.8                 | 64.6                | 14.7                      | .609                          | .58                                           | 4.01                                                          | .621                                                      |
| 22    | 73.8                       | 7.3                 | 70.1                | 11.0                      | .729                          | 7.85                                          | 3.32                                                          | .703                                                      |
| 23    | 75.4                       | 6.2                 | 72.3                | 9.3                       | .783                          | 8.43                                          | 2.91                                                          | .743                                                      |
| 24    | 75.6                       | 6.2                 | 72.5                | 9.3                       | .787                          | .47                                           | .93                                                           | .743                                                      |
| 25    | <i>Sunday.</i>             |                     | o                   | o                         |                               |                                               |                                                               |                                                           |
| 26    | 77.6                       | 5.6                 | 74.8                | 8.4                       | .849                          | 9.11                                          | .78                                                           | .766                                                      |
| 27    | 77.4                       | 7.1                 | 73.8                | 10.7                      | .822                          | 8.78                                          | 3.57                                                          | .711                                                      |
| 28    | 74.7                       | 10.0                | 69.7                | 15.0                      | .720                          | 7.69                                          | 4.73                                                          | .619                                                      |
| 29    | 75.7                       | 8.6                 | 71.4                | 12.9                      | .761                          | 8.13                                          | .15                                                           | .662                                                      |
| 30    | 78.0                       | 7.1                 | 74.4                | 10.7                      | .838                          | .95                                           | 3.62                                                          | .712                                                      |
| 31    | 79.4                       | 5.1                 | 76.8                | 7.7                       | .905                          | 9.67                                          | 2.68                                                          | .783                                                      |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.      | Range of the Barometer for<br>each hour during<br>the month. |         |         | Mean Dry Bulb Thermo-<br>meter. | Range of the Temper-<br>ature for each hour<br>during the month. |      |       |      |
|------------|--------------------------------------------------------------|---------|---------|---------------------------------|------------------------------------------------------------------|------|-------|------|
|            | Max.                                                         | Min.    | Diff.   |                                 | Max.                                                             | Min. | Diff. |      |
|            | Inches.                                                      | Inches. | Inches. | °                               | °                                                                | °    | °     |      |
| Mid-night. | 29.881                                                       | 30.037  | 29.744  | 0.293                           | 74.8                                                             | 80.8 | 69.8  | 11.0 |
| 1          | .871                                                         | .030    | .743    | .287                            | 74.1                                                             | 80.6 | 69.0  | 11.6 |
| 2          | .857                                                         | .017    | .734    | .283                            | 73.6                                                             | 80.1 | 68.2  | 11.9 |
| 3          | .846                                                         | .007    | .716    | .291                            | 73.0                                                             | 80.2 | 67.0  | 13.2 |
| 4          | .843                                                         | .001    | .701    | .300                            | 72.5                                                             | 80.0 | 66.6  | 13.4 |
| 5          | .859                                                         | .015    | .731    | .284                            | 72.0                                                             | 79.8 | 66.2  | 13.6 |
| 6          | .876                                                         | .030    | .746    | .284                            | 71.7                                                             | 79.8 | 65.4  | 14.4 |
| 7          | .899                                                         | .067    | .771    | .296                            | 71.8                                                             | 80.4 | 65.6  | 14.8 |
| 8          | .929                                                         | .097    | .795    | .302                            | 75.3                                                             | 82.6 | 68.6  | 14.0 |
| 9          | .945                                                         | .110    | .814    | .296                            | 78.5                                                             | 86.2 | 70.6  | 15.6 |
| 10         | .952                                                         | .131    | .814    | .317                            | 81.8                                                             | 89.0 | 70.3  | 18.7 |
| 11         | .942                                                         | .122    | .809    | .313                            | 84.0                                                             | 91.4 | 70.8  | 20.6 |
|            |                                                              |         |         |                                 |                                                                  |      |       |      |
| Noon.      | .913                                                         | .098    | .766    | .332                            | 86.2                                                             | 94.1 | 71.7  | 22.4 |
| 1          | .882                                                         | .088    | .735    | .353                            | 87.5                                                             | 95.2 | 72.9  | 22.3 |
| 2          | .849                                                         | .070    | .698    | .372                            | 88.2                                                             | 96.4 | 73.0  | 23.4 |
| 3          | .825                                                         | .057    | .679    | .378                            | 88.6                                                             | 96.4 | 74.2  | 22.2 |
| 4          | .812                                                         | .021    | .667    | .354                            | 88.2                                                             | 96.7 | 73.4  | 23.3 |
| 5          | .809                                                         | .038    | .666    | .372                            | 86.4                                                             | 94.2 | 72.7  | 21.5 |
| 6          | .812                                                         | .048    | .675    | .373                            | 83.5                                                             | 90.2 | 71.8  | 18.4 |
| 7          | .829                                                         | .051    | .690    | .361                            | 80.8                                                             | 86.6 | 71.6  | 15.0 |
| 8          | .849                                                         | .074    | .708    | .366                            | 79.1                                                             | 83.4 | 70.9  | 12.5 |
| 9          | .871                                                         | .068    | .727    | .341                            | 77.7                                                             | 82.4 | 70.2  | 12.2 |
| 10         | .883                                                         | .081    | .740    | .341                            | 76.8                                                             | 82.0 | 70.0  | 12.0 |
| 11         | .879                                                         | .071    | .743    | .328                            | 75.9                                                             | 81.2 | 69.2  | 12.0 |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Wet Bulb Thermometer. |      | Dry Bulb above Wet. | Computed Dew Point. |         | Mean Elastic force of Vapour. | Mean Weight of Vapour in a Cubic foot of Air. | Additional weight of vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|------------|----------------------------|------|---------------------|---------------------|---------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
|            | Dry                        | Bulb |                     | Point.              | Dew     |                               |                                               |                                                               |                                                           |
| Mid-night. | o                          | o    | o                   | o                   | Inches. | T. gr.                        | T. gr.                                        |                                                               |                                                           |
|            | 71.1                       | 3.7  | 69.2                | 5.6                 | 0.708   | 7.72                          | 1.54                                          | 0.834                                                         |                                                           |
|            | 70.7                       | 3.4  | 69.0                | 5.1                 | .704    | .68                           | .39                                           | .847                                                          |                                                           |
|            | 70.3                       | 3.3  | 68.6                | 5.0                 | .695    | .59                           | .34                                           | .850                                                          |                                                           |
|            | 69.9                       | 3.1  | 68.3                | 4.7                 | .688    | .52                           | .24                                           | .858                                                          |                                                           |
|            | 69.8                       | 2.7  | 68.4                | 4.1                 | .690    | .56                           | .07                                           | .876                                                          |                                                           |
|            | 69.2                       | 2.8  | 67.8                | 4.2                 | .677    | .42                           | .08                                           | .873                                                          |                                                           |
|            | 69.1                       | 2.6  | 67.8                | 3.9                 | .677    | .42                           | .01                                           | .880                                                          |                                                           |
|            | 69.2                       | 2.6  | 67.9                | 3.9                 | .679    | .45                           | .00                                           | .882                                                          |                                                           |
|            | 70.9                       | 4.4  | 68.7                | 6.6                 | .697    | .58                           | .82                                           | .806                                                          |                                                           |
|            | 72.4                       | 6.1  | 69.3                | 9.2                 | .711    | .69                           | 2.66                                          | .743                                                          |                                                           |
|            | 73.5                       | 8.3  | 69.3                | 12.5                | .711    | .63                           | 3.77                                          | .669                                                          |                                                           |
|            | 74.1                       | 9.9  | 69.1                | 14.9                | .706    | .55                           | 4.62                                          | .620                                                          |                                                           |
| Noon.      | 74.6                       | 11.6 | 68.8                | 17.4                | .699    | .45                           | 5.54                                          | .574                                                          |                                                           |
|            | 74.9                       | 12.6 | 68.6                | 18.9                | .695    | .38                           | 6.11                                          | .547                                                          |                                                           |
|            | 75.4                       | 12.8 | 69.0                | 19.2                | .704    | .47                           | .29                                           | .543                                                          |                                                           |
|            | 76.1                       | 12.5 | 69.8                | 18.8                | .722    | .65                           | .27                                           | .550                                                          |                                                           |
|            | 75.9                       | 12.3 | 69.7                | 18.5                | .720    | .63                           | .13                                           | .555                                                          |                                                           |
|            | 75.4                       | 11.0 | 69.9                | 16.5                | .725    | .71                           | 5.35                                          | .590                                                          |                                                           |
|            | 74.6                       | 8.9  | 70.1                | 13.4                | .729    | .82                           | 4.18                                          | .652                                                          |                                                           |
|            | 74.0                       | 6.8  | 70.6                | 10.2                | .741    | .99                           | 3.08                                          | .722                                                          |                                                           |
|            | 73.2                       | 5.9  | 70.2                | 8.9                 | .732    | .91                           | 2.62                                          | .751                                                          |                                                           |
|            | 72.6                       | 5.1  | 70.0                | 7.7                 | .727    | .87                           | .23                                           | .779                                                          |                                                           |
|            | 72.2                       | 4.6  | 69.9                | 6.9                 | .725    | .87                           | 1.96                                          | .801                                                          |                                                           |
|            | 72.0                       | 3.9  | 70.0                | 5.9                 | .727    | .90                           | .67                                           | .825                                                          |                                                           |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1855.  
Solar radiation, Weather, &c.*

| Date. | Max. Solar<br>radiation.<br>o | Rain.<br>Inches. | Prevailing direction<br>of the Wind. | General Aspect of the Sky.                                                                                         |
|-------|-------------------------------|------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------|
|       |                               |                  |                                      |                                                                                                                    |
| 1     | 140.4                         | ..               | S. or S. W. or N. or<br>N. W.        | Scattered $\backslash$ i or $\wedge$ i till 9 A. M. cloud-<br>less afterwards.                                     |
| 2     | 135.4                         | ..               | N. or E. or S.                       | Cloudless till 5 A. M. scattered $\backslash$ i af-<br>terwards.                                                   |
| 3     | ..                            | ..               | S. W. or N. W. or S.<br>E.           | Cloudy the whole day, also occasionally<br>drizzling.                                                              |
| 4     | <i>Sunday.</i>                |                  |                                      |                                                                                                                    |
| 5     | 137.0                         | ..               | Variable.                            | Cloudless till 1 P. M. scattered $\wedge$ i.                                                                       |
| 6     | 137.0                         | ..               | S.                                   | Scattered $\wedge$ i and $\backslash$ i till 8 P. M.<br>cloudless afterwards.                                      |
| 7     | 137.6                         | ..               | S. or S. W. or N. W.                 | Cloudless nearly the whole day.                                                                                    |
| 8     | 136.8                         | ..               | W. or S. W.                          | Cloudless till 5 A. M. scattered $\backslash$ i and<br>$\wedge$ i till 3 P. M. cloudless afterwards.               |
| 9     | 137.5                         | ..               | N. W. or N.                          | Cloudless.                                                                                                         |
| 10    | 137.0                         | ..               | W.                                   | Cloudless till 6 A. M. cloudy till 6 P. M.<br>cloudless afterwards.                                                |
| 11    | <i>Sunday.</i>                |                  |                                      |                                                                                                                    |
| 12    | 139.0                         | ..               | S. or N. or W.                       | Cloudless.                                                                                                         |
| 13    | 139.5                         | ..               | N. W. or N.                          | Cloudless till noon scattered $\wedge$ i till 7<br>P. M. cloudless afterwards.                                     |
| 14    | 136.5                         | ..               | N. W. or S. W. or S.                 | Cloudless till 5 A. M. various clouds<br>afterwards.                                                               |
| 15    | ..                            | ..               | S. or W.                             | Cloudless till 5 A. M. cloudy till 7 A. M.<br>cloudless afterwards.                                                |
| 16    | ..                            | ..               | S. or W. or S. W.                    | Cloudless till 6 A. M. cloudy afterwards<br>also drizzling at 5 P. M.                                              |
| 17    | 120.0                         | ..               | S. W. or W.                          | Cloudy till 4 P. M., also drizzling from<br>9 A. M. to 11 A. M. cloudless, after<br>4 P. M.                        |
| 18    | <i>Sunday.</i>                |                  |                                      |                                                                                                                    |
| 19    | 144.0                         | ..               | S. or W. S. W.                       | Cloudless.                                                                                                         |
| 20    | 141.5                         | ..               | S. W. or N. W. or S.                 | Cloudless.                                                                                                         |
| 21    | 140.9                         | ..               | W. or S.                             | Cloudless.                                                                                                         |
| 22    | 138.5                         | ..               | S. or S. W.                          | Cloudless till noon, more or less cloudy<br>afterwards.                                                            |
| 23    | 134.0                         | ..               | S. W. or S. or S. E.                 | Cloudy till 10 A. M. cloudless till 7 P. M.<br>cloudy afterwards.                                                  |
| 24    | 143.7                         | ..               | S. or S. W.                          | Cloudy.                                                                                                            |
| 25    | <i>Sunday.</i>                | 0.14             |                                      |                                                                                                                    |
| 26    | 143.0                         | ..               | S. or S. W.                          | Cloudless nearly the whole day.                                                                                    |
| 27    | 136.0                         | ..               | S. or S. W.                          | Cloudless till 1 P. M. scattered $\backslash$ i after-<br>wards.                                                   |
| 28    | 137.3                         | ..               | S. or S. W.                          | Cloudy till 7 A. M. various clouds after-<br>wards. Scattered $\backslash$ i till 8 A. M.<br>cloudless afterwards. |
| 29    | 146.5                         | ..               | S. or W.                             | Cloudless till 3 P. M., cloudy afterwards.                                                                         |
| 30    | 149.0                         | ..               | S. or W.                             | Cloudy nearly the whole day.                                                                                       |
| 31    | 137.0                         | ..               | S. or S. W.                          |                                                                                                                    |

$\wedge$ i Cirri,  $\wedge$ i Cumuli, —i Strati  $\backslash$ i Cirro-cumuli,  $\backslash$ i Cirro-strati,  $\sim$ i Cumulo-  
strati,  $\backslash\backslash$ i Nimbi.

Meteorological Observations kept at the Residency, Lucknow. Lat. 26° 51'.18, Long. 81 for the Month of August, 1854.

| Date.  | At 6 A. M. |           | At 9 P. M. |           | Aspect of Sky. | Force and direction of Wind. | Thermometer.<br>Wet Bulb. | Thermometer.<br>Dry Bulb. | Aspect of Sky. | Force and direction of Wind. | Thermometer.<br>Wet Bulb. | Thermometer.<br>Dry Bulb. | Aspect of Sky. | Force and direction of Wind. | S.E. F. vari.<br>Hazy : rain. | Aspect of Sky. |               |
|--------|------------|-----------|------------|-----------|----------------|------------------------------|---------------------------|---------------------------|----------------|------------------------------|---------------------------|---------------------------|----------------|------------------------------|-------------------------------|----------------|---------------|
|        | Wet Bulb.  | Dry Bulb. | Wet Bulb.  | Dry Bulb. |                |                              |                           |                           |                |                              |                           |                           |                |                              |                               |                |               |
| 1      | ..         | ..        | ..         | ..        | Cumuli.        | ..                           | 82                        | 86                        | 29.50          | ..                           | ..                        | 80                        | 86             | 29.52                        | able thunder                  | ..             |               |
| 2      | 81         | 84        | 45         | N. It.    | Cumuli.        | ..                           | 83                        | 89                        | .51            | S. E. It.                    | Ditto.                    | ..                        | ..             | .51                          | S. E. It.                     | ..             |               |
| 3      | 79         | 82        | .42        | Ditto.    | Ditto.         | ..                           | 83                        | 89                        | .52            | E. It.                       | Ditto.                    | ..                        | 90             | .51                          | Cumuli.                       | ..             |               |
| 4      | 80         | 84        | .45        | S. E. It. | Cirro-cumuli.  | ..                           | 81                        | 85                        | .58            | E. It.                       | Ditto.                    | ..                        | 89             | .48                          | N. E. It.                     | Ditto.         |               |
| 5      | 81         | 85        | .46        | S. W. It. | Cirri.         | ..                           | 82                        | 87                        | .55            | Ditto.                       | Ditto.                    | ..                        | ..             | .52                          | S. E. It.                     | ..             |               |
| 6      | 80         | 83        | .52        | ..        | Cumulo-strati. | ..                           | 81                        | 84                        | .56            | S. E. It.                    | Strati.                   | ..                        | 85             | .52                          | Cumulo-strati.                | ..             |               |
| 7      | 81         | 83        | .44        | Ditto.    | Ditto.         | ..                           | 82                        | 85                        | .50            | Ditto.                       | Ditto.                    | ..                        | 85             | .48                          | W. It.                        | Strati : rain. |               |
| 8      | 80         | 83        | .40        | Ditto.    | Cirro-strati.  | ..                           | 81                        | 84                        | .45            | W. It.                       | Ditto.                    | ..                        | ..             | ..                           | ..                            | ..             |               |
| 9      | 80         | 83        | .40        | W. It.    | Ditto.         | ..                           | 81                        | 83                        | .45            | Ditto.                       | Strati : rain.            | ..                        | 83             | .48                          | W. It.                        | Strati : rain. |               |
| 10     | 78         | 81        | .45        | Ditto.    | Strati.        | ..                           | 81                        | 82                        | .53            | S. W. It.                    | Strati.                   | ..                        | ..             | ..                           | ..                            | ..             |               |
| 11     | 80         | 81        | .45        | S. It.    | Ditto.         | ..                           | 81                        | 83                        | .50            | S. It.                       | Ditto.                    | ..                        | ..             | .46                          | S. W. It.                     | Cumulo-strati. |               |
| 12     | 80         | 81        | .44        | Light.    | Cirro-strati.  | ..                           | 81                        | 83                        | .48            | Ditto.                       | Rain.                     | ..                        | 85             | .50                          | ..                            | Cirro-cumuli.  |               |
| 13     | 80         | 82        | .45        | Ditto.    | Cumulo-strati. | ..                           | 81                        | 83                        | .48            | W. It.                       | Strati.                   | ..                        | 86             | .50                          | Calm.                         | Cumuli.        |               |
| 14     | 80         | 83        | .48        | S. It.    | Cirro-strati.  | ..                           | 80                        | 83                        | .55            | S. W.                        | Cumulo-strati.            | ..                        | 84             | .54                          | S. It.                        | Cumulo-strati. |               |
| 15     | 80         | 82        | .52        | Calm.     | Ditto.         | ..                           | 81                        | 83                        | .58            | S. It.                       | Ditto.                    | ..                        | 82             | .60                          | S. E. It.                     | Strati : rain. |               |
| 16     | 80         | 81        | .56        | Ditto.    | Strati.        | ..                           | 81                        | 82                        | .60            | N. W. It.                    | Rain.                     | ..                        | 84             | .62                          | S. W. It.                     | Strati.        |               |
| 17     | ..         | ..        | ..         | ..        | ..             | ..                           | 80                        | 82                        | .68            | N. E. It.                    | Strati.                   | ..                        | 83             | .64                          | W. It.                        | Rain.          |               |
| 18     | 78         | 80        | .62        | W. It.    | Cirro-cumuli   | ..                           | 80                        | 83                        | .68            | W. It.                       | Cumulo-strati.            | ..                        | ..             | ..                           | ..                            | ..             |               |
| 19     | 79         | 81        | .62        | Ditto.    | Ditto.         | ..                           | 81                        | 82                        | .68            | S. W. It.                    | Ditto.                    | ..                        | ..             | ..                           | ..                            | ..             |               |
| 20     | 80         | 82        | .58        | Ditto.    | Ditto.         | ..                           | 82                        | 84                        | .68            | S. W. It.                    | Ditto.                    | ..                        | ..             | ..                           | ..                            | ..             |               |
| 21     | 81         | 82        | .60        | S. E. It. | Ditto.         | ..                           | 81                        | 84                        | .68            | E. It.                       | Ditto.                    | ..                        | ..             | ..                           | ..                            | ..             |               |
| 22     | ..         | ..        | ..         | ..        | ..             | ..                           | 83                        | 85                        | .64            | S. It.                       | Lt. rain.                 | ..                        | ..             | ..                           | ..                            | ..             |               |
| 23     | 80         | 82        | .54        | N. It.    | Strati : rain. | ..                           | 81                        | 82                        | .58            | N. It.                       | Rain.                     | ..                        | ..             | ..                           | ..                            | ..             |               |
| 24     | 77         | 79        | .50        | S. W. f.  | Rain.          | ..                           | ..                        | ..                        | ..             | ..                           | ..                        | ..                        | ..             | ..                           | ..                            | ..             |               |
| 25     | 78         | 80        | .54        | S. W. It. | Ditto.         | ..                           | ..                        | ..                        | ..             | ..                           | ..                        | 79                        | .81            | .54                          | S. W. It.                     | Ditto.         |               |
| 26     | 78         | 80        | .62        | S. W.     | Cirro-strati.  | ..                           | 81                        | 84                        | .72            | W. It.                       | Cirri.                    | ..                        | 80             | .84                          | ..                            | Cumuli.        |               |
| 27     | 79         | 82        | .64        | S. W. It. | Clear.         | ..                           | 81                        | 86                        | .72            | Ditto.                       | Clear.                    | ..                        | 82             | .87                          | .68                           | W. It.         |               |
| 28     | 79         | 83        | .60        | N. W. It. | Ditto.         | ..                           | ..                        | ..                        | ..             | ..                           | ..                        | ..                        | ..             | ..                           | ..                            | Girri.         |               |
| 29     | 79         | 84        | .58        | Ditto.    | Cirri.         | ..                           | 80                        | 86                        | .68            | Ditto.                       | Clear.                    | ..                        | 80             | .91                          | .66                           | W. It.         |               |
| 30     | 81         | 84        | .62        | Ditto.    | Ditto.         | ..                           | ..                        | ..                        | ..             | ..                           | ..                        | ..                        | 83             | .91                          | .66                           | S. W. It.      | Cirro-cumuli. |
| 31     | 83         | 86        | .64        | S. It.    | Ditto.         | ..                           | 83                        | 89                        | .68            | S. It.                       | Clear.                    | ..                        | 83             | .92                          | .68                           | S. E. It.      | Ditto.        |
| Total, | 2232       | 2303      | 1459       | ..        | ..             | ..                           | 2191                      | 2280                      | 1565           | ..                           | ..                        | ..                        | 1872           | 1931                         | 1276                          | ..             | ..            |
| Avg.   | 79.714     | 82.250    | 29.520     | ..        | ..             | ..                           | 81.148                    | 84.444                    | 29.581         | ..                           | ..                        | ..                        | 81.391         | 86.130                       | 29.580                        | ..             | ..            |

*Meteorological Observations Kept at the Residency, Lucknow. Lat. 26°51'18", Long. 81° for the Month of August, 1854.*

| At 3 P. M.                   |              |                                    |                   | At 6 P. M.                   |              |                                    |                   | Remarks.              |                |               |                                      |
|------------------------------|--------------|------------------------------------|-------------------|------------------------------|--------------|------------------------------------|-------------------|-----------------------|----------------|---------------|--------------------------------------|
| Thermometer.<br>Wet<br>Bulb. | Dry<br>Bulb. | Force and<br>direction<br>of Wind. | Aspect of<br>Sky. | Thermometer.<br>Wet<br>Bulb. | Dry<br>Bulb. | Force and<br>direction of<br>Wind. | Aspect of<br>Sky. | Rain Gauge<br>Inches. |                |               |                                      |
| 80                           | 84           | .42                                | N. It.            | Cumulo-strati.               | 80           | .33                                | .40               | Calm.                 | Cumulo-strati. | 1.60 at noon. |                                      |
| 83                           | 90           | .42                                | E. It.            | Cirro-cumuli.                | 82           | .86                                | .45               | Lt. E.                | Ditto.         | .10           | Shower at P. M.                      |
| 82                           | 89           | .44                                | S. It.            | Cumuli.                      | 82           | .88                                | .42               | Ditto.                | Cumuli.        | .5            | Thunder and rain at 6 P. M.          |
| 81                           | 89           | .48                                | E. It.            | Ditto.                       | 81           | .89                                | .44               | Lt. S. E.             | Cirro-cumuli.  | .2            |                                      |
| 83                           | 88           | .48                                | N. It.            | Ditto.                       | 82           | .88                                | .44               | Ditto.                | Cumuli.        | 1.5           |                                      |
| 82                           | 85           | .45                                | S. E. It.         | Cumulo-strati.               | 82           | .85                                | .45               | S. E. It.             | Cumulo-strati. | 1.            |                                      |
| 82                           | 85           | .38                                | S. W. It.         | Rain,                        | 82           | .85                                | .38               | W. It.                | Cumulo-strati. | .1            |                                      |
| ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                    | Strati.        | .1            |                                      |
| 80                           | 82           | .42                                | W. It.            | Rain.                        | 80           | .83                                | .42               | W. It.                | Strati.        | .5            |                                      |
| 81                           | 84           | .45                                | Ditto.            | Cumuli.                      | 81           | .83                                | .45               | Ditto.                | Cumulo-strati. | .05           |                                      |
| 82                           | 86           | .42                                | S. E. It.         | Cumulo-strati.               | 80           | .84                                | .41               | Ditto.                | Ditto.         | .05           |                                      |
| 82                           | 85           | ..                                 | Ditto.            | Cumuli.                      | ..           | ..                                 | ..                | ..                    | ..             | .2            |                                      |
| ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                    | ..             | .0            |                                      |
| 62                           | 85           | .43                                | W. It.            | Cumuli.                      | ..           | ..                                 | ..                | ..                    | ..             | .05           | [of yesterday.]                      |
| 82                           | 84           | .54                                | S. It.            | Strat. rain.                 | 79           | .81                                | .38               | S. It.                | ..             | .50           | Very light rain during the afternoon |
| ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                    | ..             |               | Gentle rain all yesterday and during |
| 80                           | 84           | .62                                | Lt.               | Strati.                      | 81           | .83                                | .60               | S. W. It.             | Cumuli.        | 1.55          | [the night.]                         |
| ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                    | ..             | ..            | Occasional light shower.             |
| 81                           | 84           | .58                                | W. It.            | Cumulo-strati.               | ..           | ..                                 | ..                | ..                    | ..             | ..            |                                      |
| ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                    | ..             | ..            |                                      |
| 81                           | 85           | .58                                | N. It.            | Cumulo-strati.               | ..           | ..                                 | ..                | ..                    | ..             | ..            |                                      |
| 80                           | 82           | .56                                | W. It.            | Ditto.                       | ..           | ..                                 | ..                | ..                    | ..             | ..            |                                      |
| 79                           | 81           | .50                                | S. W. It.         | Ditto.                       | ..           | ..                                 | ..                | ..                    | ..             | ..            |                                      |
| 80                           | 85           | .56                                | W. It.            | Cumuli.                      | ..           | ..                                 | ..                | ..                    | ..             | ..            |                                      |
| 82                           | 88           | .66                                | Lt.               | Ditto.                       | 80           | .86                                | .62               | W. It.                | Cumuli.        | 1.00          |                                      |
| ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                    | ..             | ..            |                                      |
| 81                           | 85           | .58                                | N. It.            | Cumulo-strati.               | ..           | ..                                 | ..                | ..                    | ..             | .05           |                                      |
| 80                           | 82           | .56                                | W. It.            | Ditto.                       | ..           | ..                                 | ..                | ..                    | ..             | .05           |                                      |
| 79                           | 81           | .50                                | S. W. It.         | Ditto.                       | ..           | ..                                 | ..                | ..                    | ..             | 4.90          |                                      |
| 80                           | 85           | .56                                | W. It.            | Cumuli.                      | ..           | ..                                 | ..                | ..                    | ..             | 5.80          |                                      |
| 82                           | 88           | .66                                | Lt.               | Ditto.                       | ..           | ..                                 | ..                | ..                    | ..             | ..            |                                      |
| ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                    | ..             | ..            |                                      |
| 80                           | 91           | .58                                | W. It.            | Cirri.                       | 81           | .90                                | .58               | W. It.                | Clear.         | ..            |                                      |
| 81                           | 91           | .62                                | S. It.            | Cirro-cumuli.                | 81           | .90                                | .60               | S. It.                | Cirri.         | ..            |                                      |
| 84                           | 91           | .62                                | S. E. It.         | Cumuli.                      | ..           | ..                                 | ..                | ..                    | ..             | ..            |                                      |
| 1878                         | 1078         | 1126                               | ..                | ..                           | 129.5        | 1368                               | .742              | ..                    | ..             | 19.80         |                                      |
| 30486                        | 230          | 29489                              | ..                | ..                           | 80.937       | 85.500                             | 29.464            | ..                    | ..             | ..            |                                      |

*Abstract of the Meteorological Register for August, 1854.*

*Lucknow, 1st September, 1854.*

*Meteorological Register kept at Lucknow.*

三

| Thermometer<br>6 A. M. | Thermometer<br>9 A. M. | Thermometer<br>Noon. | Thermometer<br>3 P. M. | Thermometer<br>6 P. M. | Remarks.                                                                                                                                                                                                                                                        |
|------------------------|------------------------|----------------------|------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 29.64                  | Maximum.               | Mid.                 | Mid.                   | Mid.                   | Prevailing winds this month, S. E. and W. but generally variable. Weather cloudy but generally variable. Weather cloudy Rain fell on 21 days. The heaviest fall on the 24 and 25. Total quantity 19.18. The atmosphere of course damp and loaded with moisture. |
| 29.40                  | Minimum.               | Mid.                 | Mid.                   | Mid.                   | Dry 84.911.                                                                                                                                                                                                                                                     |
| 29.520                 | Minimum.               | Mid.                 | Mid.                   | Mid.                   | Ditto                                                                                                                                                                                                                                                           |
| 29.72                  | Maximum.               | Barometer<br>9 A. M. | Barometer<br>Noon.     | Barometer.<br>3 P. M.  | Dry 84.911.                                                                                                                                                                                                                                                     |
| 29.45                  | Minimum.               | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                                 |
| 29.581                 | Maximum.               | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                                 |
| 29.69                  | Maximum.               | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                                 |
| 29.46                  | Minimum.               | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                                 |
| 29.580                 | Maximum.               | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                                 |
| 29.66                  | Maximum.               | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                                 |
| 29.38                  | Maximum.               | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                                 |
| 29.489                 | Minimum.               | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                                 |
| 29.62                  | Maximum.               | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                                 |
| 29.38                  | Minimum.               | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                                 |
| 29.464                 | Maximum.               | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                                 |

*Meteorological Observations kept at the Residency, Lucknow. Lat. 26°51'. Long. 81°, for the Month of September, 1854.*

*Meteorological Observations kept at the Residency, Lucknow. Lat. 26°51'18", Long. 81° for the Month of September, 1854.*

| At 3 p. m.   |           |           |                              | At 6 p. m.                             |           |           |             | Remarks.                     |                    |                    |                                                                 |
|--------------|-----------|-----------|------------------------------|----------------------------------------|-----------|-----------|-------------|------------------------------|--------------------|--------------------|-----------------------------------------------------------------|
| Thermometer. | Dry Bulb. | Wet Bulb. | Force and direction of Wind. | Thermometer.                           | Wet Bulb. | Dry Bulb. | Baro-meter. | Force and direction of Wind. | Aspect of Sky.     | Rain Gauge Inches. |                                                                 |
| 81           | 86        | 29.62     | S. E. F.<br>.60              | Cumulo-strati.<br>Thunder-rain-cumuli. | 83        | .87       | 29.38       | S. E. It.<br>.62             | Cumuli.<br>Ditto.  | .9                 | Heavy squall of wind and rain with thunder @ 2 p. m. to 3 p. m. |
| 83           | 90        | .60       | S. E. It.                    | 82                                     | .88       | .65       | Ditto.      |                              | Cirro-cumuli.      | 1.6                | Heavy rain last night with thunder-storm.                       |
| ..           | ..        | ..        | ..                           | 83                                     | .88       | .60       | Ditto.      |                              | Cirro-enamuli.     | .2                 | Showers.                                                        |
| ..           | ..        | ..        | ..                           | ..                                     | ..        | ..        | ..          |                              | Ditto.             | .2                 | Ditto.                                                          |
| 83           | 89        | .58       | S. E. It.                    | Cumuli.                                | ..        | ..        | ..          | ..                           | ..                 | ..                 | Fresh breezes during the day.                                   |
| 80           | 89        | .52       | S. E. F.<br>.54              | Cumuli.<br>Ditto.                      | 81        | .86       | .58         | S. E. It.                    | Cumulo-strati.     | ..                 | Ditto.                                                          |
| 81           | 89        | .54       | E. It.                       | ..                                     | ..        | ..        | ..          | ..                           | Cumuli.            | ..                 | Shower at 6 p. m.                                               |
| ..           | ..        | ..        | ..                           | ..                                     | ..        | ..        | ..          | ..                           | ..                 | ..                 |                                                                 |
| 80           | 90        | .62       | S. E. It.                    | Cumuli.<br>Ditto.                      | 81        | .91       | .61         | S. E. It.                    | Cumuli.            | ..                 |                                                                 |
| 80           | 90        | .54       | Ditto.                       | ..                                     | ..        | ..        | ..          | ..                           | Strati.            | ..                 |                                                                 |
| 80           | 83        | .46       | S. E. F.<br>.38              | S-heavy-rain-cumuli.<br>Clear.         | 79        | .83       | .44         | E. It.                       | Cumulo-strati.     | 0.6                | Rain at 4 p. m.                                                 |
| 80           | 83        | .38       | W. It.                       | ..                                     | ..        | ..        | ..          | ..                           | Cumuli.            | 5.7                | [and lightning.]                                                |
| 78           | 85        | .58       | N. E. It.                    | ..                                     | 80        | .85       | .62         | N. E. It.                    | Cumuli.            | 0.2                | Heavy rain all night with thunder.                              |
| 79           | 85        | .62       | W. It.                       | ..                                     | 85        | .62       | W. It.      | ..                           | Clear.             | .3                 | Light rain yesterday.                                           |
| 81           | 86        | .66       | S. W. It.                    | Cumuli.                                | ..        | ..        | ..          | ..                           | ..                 | ..                 |                                                                 |
| 80           | 83        | .70       | Ditto.                       | Cumulo-strati.                         | ..        | ..        | ..          | ..                           | ..                 | ..                 |                                                                 |
| 81           | 87        | .73       | Ditto.                       | Cumuli.<br>Clear.                      | 82        | .86       | .72         | S. W. It.                    | Cirro-cumuli.      | .1                 | Rain at 2 p. m.                                                 |
| 82           | 87        | .74       | Ditto.                       | ..                                     | 82        | .86       | .75         | Ditto.                       | Clear.             | ..                 |                                                                 |
| ..           | ..        | ..        | ..                           | ..                                     | 82        | .88       | .80         | W. It.                       | Ditto.             | ..                 |                                                                 |
| ..           | ..        | ..        | ..                           | ..                                     | 88        | .86       | .78         | S. E. It.                    | Ditto.             | 0.2                |                                                                 |
| ..           | ..        | ..        | ..                           | ..                                     | ..        | ..        | ..          | ..                           | ..                 | ..                 |                                                                 |
| ..           | ..        | ..        | ..                           | ..                                     | ..        | ..        | ..          | ..                           | ..                 | ..                 |                                                                 |
| 78           | 84        | .84       | S. E. It.                    | Cirri.                                 | ..        | ..        | ..          | ..                           | ..                 | ..                 |                                                                 |
| 76           | 84        | .84       | E. F.                        | Cumuli.                                | 73        | .82       | .85         | E. It.                       | Cumuli.            | 0.1                |                                                                 |
| ..           | ..        | ..        | ..                           | ..                                     | 74        | .77       | .78         | ..                           | Strati : lt. rain. | .05                |                                                                 |
| 78           | 80        | .80       | S. E. It.                    | Cumuli.<br>Ditto.                      | ..        | ..        | ..          | ..                           | ..                 | .50                |                                                                 |
| 78           | 82        | .80       | Ditto.                       | Ditto.                                 | ..        | ..        | ..          | ..                           | ..                 | .20                |                                                                 |
| 78           | 84        | .85       | Ditto.                       | ..                                     | ..        | ..        | ..          | ..                           | ..                 | ..                 |                                                                 |
| 1597         | 1716      | 1302      | ..                           | ..                                     | 1211      | 1286      | 980         | ..                           | ..                 | 11.05              | ..                                                              |
| 79.850       | 85.800    | 29.615    | ..                           | ..                                     | 80.733    | 85.733    | 29.653      | ..                           | ..                 | ..                 | ..                                                              |

*Abstract of the Meteorological Register for September, 1854.*

*Lucknow, 1st October, 1854.*

J. FAYER, M. D. F. R. G. S.

## E R R A T A.

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| Page | line  |                                                                    |
|------|-------|--------------------------------------------------------------------|
| 2    | 13    | <i>for "Su-Newe" read "Su-mwe."</i>                                |
| —    | 34-35 | <i>for "tassi" read "tapi."</i>                                    |
| 3    | 1-2   | <i>for "tassi" read "tapi."</i>                                    |
| —    | 4-5   | <i>for "inteo" in three places read "mteo."</i>                    |
| —    | 29    | <i>for "M-angu" read "M-anga."</i>                                 |
| 5    | 17    | <i>for "bu" read "bri."</i>                                        |
| —    | 21    | <i>for "huv-ge" read "bui-ge."</i>                                 |
| 6    | 6     | <i>for "So lung" read "So hing."</i>                               |
| —    | 21    | <i>for "cha-lung" read "cha-hing."</i>                             |
| —    | 30    | <i>for "Nya" read "Nyo."</i>                                       |
| —    | 32    | <i>for "tap pe ke ku chenema" read "tappe ke ku chenena."</i>      |
| 7    | 17    | <i>for "Mum" read "Nunu."</i>                                      |
| —    | 23    | <i>for "Egj" read "e. g."</i>                                      |
| —    | 31    | <i>for "kai apai" read "kai dpai."</i>                             |
| 8    | 2     | <i>for "klan" and "klau kapluk" read "klau" and "klau kaplak."</i> |
| —    | 23    | <i>for "kadun" read "kadnu."</i>                                   |
| —    | 25    | <i>for "Si kamcheng kadun" read "Ti kancheng kadnu."</i>           |
| —    | 32    | <i>for "Kambum" read "Kambrum."</i>                                |

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*Meteorological Observations kept at the Residency, Lucknow. N. Lat. 26°51'.18. Long. 81, for the Month of November, 1854.*

| Date.  | At 6 A. M.                   |              |                                    | At 9 A. M.        |                              |              | At Noon.                           |                   |                              |
|--------|------------------------------|--------------|------------------------------------|-------------------|------------------------------|--------------|------------------------------------|-------------------|------------------------------|
|        | Thermometer.<br>Wet<br>Bulb. | Dry<br>Bulb. | Force and<br>direction of<br>Wind. | Aspect of<br>Sky. | Thermometer.<br>Wet<br>Bulb. | Dry<br>Bulb. | Force and<br>direction of<br>Wind. | Aspect of<br>Sky. | Thermometer.<br>Wet<br>Bulb. |
| 1      | 67                           | 70           | 29.98                              | S. E. It.         | Strati., rain.               | 68           | 70                                 | 30.               | E. It.                       |
| 2      | ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                           |
| 3      | ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                           |
| 4      | 69                           | 71           | 30.                                | W. It.            | Cumulo-strati.               | 69           | 71                                 | .14               | N. W. It.                    |
| 5      | ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                           |
| 6      | 70                           | 72           | 29.94                              | W. It.            | Cirri.                       | 70           | 73                                 | .02               | W. It.                       |
| 7      | 65                           | 68           | .96                                | Ditto.            | Clear.                       | 65           | 71                                 | .02               | S. W. It.                    |
| 8      | 62                           | 67           | 30.02                              | S. It.            | Ditto.                       | ..           | ..                                 | ..                | ..                           |
| 9      | ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                           |
| 10     | 55                           | 62           | .12                                | W. It.            | Clear.                       | 59           | 67                                 | .12               | W. It.                       |
| 11     | ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                           |
| 12     | 56                           | 64           | .8                                 | E. It.            | Clear.                       | ..           | ..                                 | ..                | ..                           |
| 13     | 58                           | 62           | .04                                | S. E. It.         | Cirri.                       | ..           | ..                                 | ..                | ..                           |
| 14     | ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                           |
| 15     | ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                           |
| 16     | 60                           | 64           | .04                                | S. E. It.         | Clear.                       | ..           | ..                                 | ..                | ..                           |
| 17     | ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                           |
| 18     | 53                           | 60           | 29.98                              | W. It.            | Clear.                       | ..           | ..                                 | ..                | ..                           |
| 19     | ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                           |
| 20     | 53                           | 59           | 30.02                              | W. It.            | Clear.                       | ..           | ..                                 | ..                | ..                           |
| 21     | 53                           | 57           | .06                                | Ditto.            | Ditto.                       | ..           | ..                                 | ..                | ..                           |
| 22     | 52                           | 56           | .08                                | Ditto.            | Ditto.                       | ..           | ..                                 | ..                | ..                           |
| 23     | 53                           | 58           | .04                                | W. It.            | Ditto.                       | ..           | ..                                 | ..                | ..                           |
| 24     | 57                           | 60           | .10                                | Ditto.            | Ditto.                       | ..           | ..                                 | ..                | ..                           |
| 25     | 56                           | 58           | .08                                | S. It.            | Ditto.                       | ..           | ..                                 | ..                | ..                           |
| 26     | 56                           | 59           | .12                                | S. W. It.         | Ditto.                       | 57           | 63                                 | .24               | S. W. It.                    |
| 27     | 58                           | 60           | .08                                | W. It.            | Cirri.                       | 60           | 65                                 | .18               | N. W. It.                    |
| 28     | 58                           | 62           | .05                                | S. It.            | Cloudy.                      | ..           | ..                                 | ..                | ..                           |
| 29     | 56                           | 58           | .04                                | Ditto.            | Clear.                       | ..           | ..                                 | ..                | ..                           |
| 30     | 55                           | 58           | .08                                | N. W. It.         | Cirri.                       | ..           | ..                                 | ..                | ..                           |
| Total. | 1222                         | 1305         | .91                                | ..                | ..                           | ..           | ..                                 | ..                | ..                           |
| Averg. | 58.190                       | 62.143       | 30.433                             | ..                | ..                           | ..           | ..                                 | ..                | ..                           |

*Meteorological Observations kept at the Residency, Lucknow N. Lat. 26°51'.18, Long. 81° for the Month of November, 1854.*

| At 3 P. M.                   |              |                                    |                   | At 6 P. M.                   |              |                                    |                   | Remarks.             |             |
|------------------------------|--------------|------------------------------------|-------------------|------------------------------|--------------|------------------------------------|-------------------|----------------------|-------------|
| Thermometer.<br>Wet<br>Bulb. | Dry<br>Bulb. | Force and<br>direction<br>of Wind. | Aspect of<br>Sky. | Thermometer.<br>Wet<br>Bulb. | Dry<br>Bulb. | Force and<br>direction of<br>Wind. | Aspect of<br>Sky. | Rain Gauge<br>Inches |             |
| 70                           | 73           | 29.92                              | W. It.            | ..                           | ..           | ..                                 | ..                | ..                   | Light rain. |
| 71                           | 76           | .96                                | N. W. It.         | Cumulo-strati.               | ..           | ..                                 | ..                | ..                   |             |
| 71                           | 76           | .94                                | W. It.            | Cumuli.                      | ..           | ..                                 | ..                | ..                   |             |
| 68                           | 76           | 30.02                              | Ditto.            | ..                           | ..           | ..                                 | ..                | ..                   |             |
| 64                           | 76           | .04                                | S. It.            | Clear.                       | 64           | 75                                 | 29.95             | N. W. It.            |             |
| 63                           | 76           | .02                                | W. It.            | Ditto.                       | ..           | ..                                 | ..                | ..                   |             |
| 62                           | 74           | .20                                | Ditto.            | Ditto.                       | ..           | ..                                 | ..                | ..                   |             |
| 59                           | 73           | .16                                | S. E. It.         | Ditto.                       | ..           | ..                                 | ..                | ..                   |             |
| 61                           | 73           | .08                                | Ditto.            | Clear.                       | ..           | ..                                 | ..                | ..                   |             |
| 61                           | 74           | .12                                | S. W. It.         | Ditto.                       | ..           | ..                                 | ..                | ..                   |             |
| 63                           | 73           | .10                                | S. W. It.         | Clear.                       | ..           | ..                                 | ..                | ..                   |             |
| ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                   |             |
| ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                   |             |
| 58                           | 72           | .08                                | W. It.            | Clear.                       | ..           | ..                                 | ..                | ..                   |             |
| 57                           | 72           | .08                                | Ditto.            | Ditto.                       | ..           | ..                                 | ..                | ..                   |             |
| 61                           | 70           | .10                                | W. It.            | Clear.                       | ..           | ..                                 | ..                | ..                   |             |
| 61                           | 70           | .12                                | S. It.            | Clear.                       | ..           | ..                                 | ..                | ..                   |             |
| 60                           | 70           | .20                                | S. W. It.         | Ditto.                       | ..           | ..                                 | ..                | ..                   |             |
| 62                           | 71           | .12                                | N. W. It.         | Cloudy.                      | ..           | ..                                 | ..                | ..                   |             |
| ..                           | ..           | ..                                 | ..                | ..                           | ..           | ..                                 | ..                | ..                   |             |
| 1001                         | 1245         | 146                                | ..                | ..                           | ..           | ..                                 | ..                | ..                   | 1.11        |
| 62,563                       | 73,235       | 30,811                             | ..                | ..                           | ..           | ..                                 | ..                | ..                   | ....        |
|                              |              |                                    |                   | 63,818                       | 71,455       | 30,691                             |                   |                      | ....        |

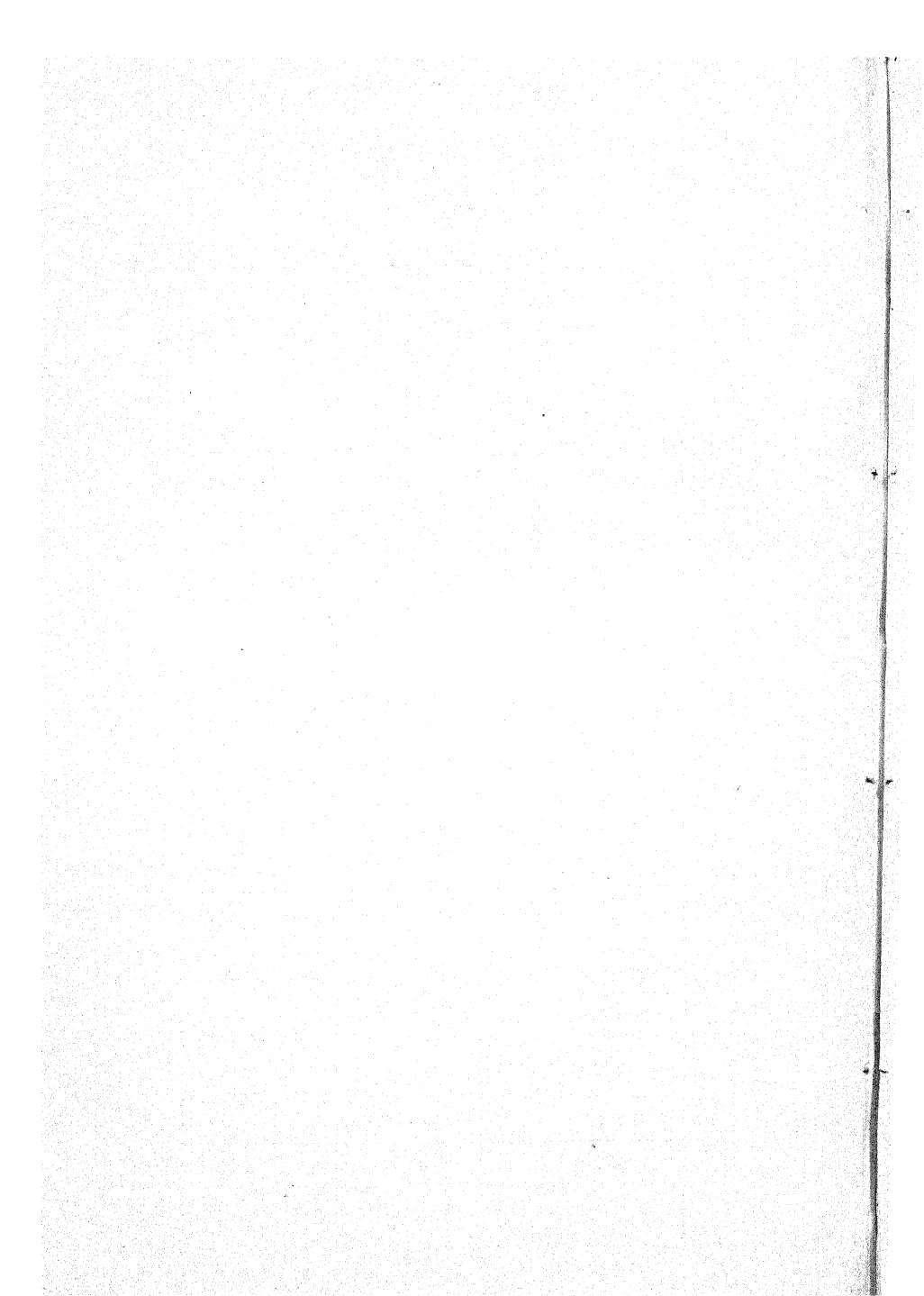
*Abstract of the Meteorological Register for November, 1854.*

Lucknow, 1st December, 1854.

*Meteorological Register kept at Lucknow.*

| Thermometer<br>6 A. M. | Thermometer<br>9 A. M. | Thermometer<br>Noon. | Thermometer<br>3 P. M. | Thermometer<br>6 P. M. | Thermometer<br>6 P. M. | Remarks.                                                                                                            |
|------------------------|------------------------|----------------------|------------------------|------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------|
| 30.80                  | Maximum.               | Mid.                 | Mid.                   | Mid.                   | Mid.                   | The prevailing winds this month, W. & S. W. moderate.                                                               |
| 30.433                 | Maximum.               | Mid.                 | Mid.                   | Mid.                   | Mid.                   | The weather generally speaking clear and pleasant.                                                                  |
| 32.25                  | Maximum.               | Mid.                 | Mid.                   | Mid.                   | Mid.                   | There have been a light shower of rain for 3 days 1, 2, and 4 to the extent of 2, 1, Mean Temperature of the month. |
| 30.02                  | Minimum.               | Mid.                 | Mid.                   | Mid.                   | Mid.                   | Wet Bulb, . . . . . 62.027.                                                                                         |
| 30.133                 | Maximum.               | Mid.                 | Mid.                   | Barometer<br>3 P. M.   | Barometer.<br>6 P. M.  | Dry, . . . . . 69.412.                                                                                              |
| 30.22                  | Maximum.               | Mid.                 | Mid.                   | Mid.                   | Mid.                   |                                                                                                                     |
| 30.108                 | Mid.                   | Mid.                 | Mid.                   | Mid.                   | Mid.                   |                                                                                                                     |
| 29.96                  | Minimum.               | Mid.                 | Mid.                   | Mid.                   | Mid.                   |                                                                                                                     |
| 30.20                  | Maximum.               | Mid.                 | Mid.                   | Mid.                   | Mid.                   |                                                                                                                     |
| 30.811                 | Mid.                   | Mid.                 | Mid.                   | Mid.                   | Mid.                   |                                                                                                                     |
| 30.92                  | Maximum.               | Mid.                 | Mid.                   | Mid.                   | Mid.                   |                                                                                                                     |
| 30.691                 | Mid.                   | Mid.                 | Mid.                   | Mid.                   | Mid.                   |                                                                                                                     |

J. FAYER, M. D., F. R. C. S.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1855.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

feet.

Height of the cistern of the Standard Barometer above the level of the Sea, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date.          | Mean Height of<br>the Barometer<br>at $32^{\circ}$ Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempe-<br>rature during<br>the day. |      |       |
|----------------|----------------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|--------------------------------------------------|------|-------|
|                |                                                          | Max.                                      | Min.    | Diff.   |                               | Max.                                             | Min. | Diff. |
| 1              | Inches.                                                  | Inches.                                   | Inches. | Inches. | °                             | °                                                | °    | °     |
| <i>Sunday.</i> |                                                          |                                           |         |         |                               |                                                  |      |       |
| 2              | .783                                                     | 29.872                                    | 29.720  | .152    | 85.1                          | 96.4                                             | 75.9 | 20.5  |
| 3              | .779                                                     | .860                                      | .719    | .141    | 84.6                          | 95.2                                             | 76.4 | 18.8  |
| 4              | .802                                                     | .885                                      | .742    | .143    | 85.4                          | 94.6                                             | 79.6 | 15.0  |
| 5              | .794                                                     | .876                                      | .720    | .156    | 83.4                          | 93.8                                             | 75.8 | 18.0  |
| 6              | <i>Good-fri</i>                                          | <i>day.</i>                               |         |         |                               |                                                  |      |       |
| 7              | .781                                                     | .838                                      | .725    | .113    | 85.4                          | 97.7                                             | 77.5 | 20.2  |
| 8              | <i>Sunday.</i>                                           |                                           |         |         |                               |                                                  |      |       |
| 9              | .841                                                     | .920                                      | .760    | .160    | 86.1                          | 96.8                                             | 79.6 | 17.2  |
| 10             | .815                                                     | .886                                      | .761    | .125    | 84.6                          | 93.4                                             | 77.8 | 15.6  |
| 11             | .822                                                     | .892                                      | .770    | .122    | 84.6                          | 93.2                                             | 78.4 | 14.8  |
| 12             | .852                                                     | .935                                      | .787    | .148    | 85.2                          | 93.8                                             | 78.4 | 15.4  |
| 13             | .805                                                     | .901                                      | .734    | .167    | 83.5                          | 93.0                                             | 77.4 | 15.6  |
| 14             | .771                                                     | .850                                      | .676    | .174    | 84.3                          | 95.2                                             | 76.0 | 19.2  |
| 15             | <i>Sunday.</i>                                           |                                           |         |         |                               |                                                  |      |       |
| 16             | .801                                                     | .896                                      | .712    | .184    | 85.4                          | 95.0                                             | 78.2 | 16.8  |
| 17             | .773                                                     | .867                                      | .672    | .195    | 81.5                          | 90.6                                             | 73.6 | 17.0  |
| 18             | .727                                                     | .809                                      | .670    | .139    | 81.8                          | 90.4                                             | 75.8 | 14.6  |
| 19             | .728                                                     | .784                                      | .674    | .110    | 81.2                          | 89.2                                             | 76.6 | 12.6  |
| 20             | .721                                                     | .794                                      | .620    | .174    | 76.9                          | 83.4                                             | 72.8 | 10.6  |
| 21             | .725                                                     | .789                                      | .630    | .159    | 77.4                          | 85.8                                             | 72.0 | 13.8  |
| 22             | <i>Sunday.</i>                                           |                                           |         |         |                               |                                                  |      |       |
| 23             | .724                                                     | .798                                      | .654    | .144    | 70.7                          | 76.6                                             | 66.0 | 10.6  |
| 24             | .765                                                     | .845                                      | .692    | .163    | 74.9                          | 84.8                                             | 67.6 | 17.2  |
| 25             | .721                                                     | .788                                      | .641    | .147    | 79.5                          | 87.6                                             | 71.2 | 16.4  |
| 26             | .662                                                     | .720                                      | .584    | .136    | 81.5                          | 90.2                                             | 75.0 | 15.2  |
| 27             | .709                                                     | .789                                      | .637    | .152    | 81.5                          | 91.2                                             | 74.0 | 17.2  |
| 28             | .722                                                     | .795                                      | .669    | .126    | 84.7                          | 92.8                                             | 79.8 | 13.0  |
| 29             | <i>Sunday.</i>                                           |                                           |         |         |                               |                                                  |      |       |
| 30             | .711                                                     | .799                                      | .640    | .159    | 87.5                          | 96.8                                             | 80.9 | 15.9  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1855.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Date. | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a Cubic foot of Air. | Additional weight of vapour required for complete saturation. | Mean degree of Humidity complete saturation being unity. |
|-------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------|
| 1     | Sunday                     | ° °                 | °                   | °                         | Inches.                       | T. gr.                                        | T. gr.                                                        |                                                          |
| 2     | 76.5                       | 8.6                 | 72.2                | 12.9                      | .781                          | 8.33                                          | 4.24                                                          | .663                                                     |
| 3     | 76.5                       | 8.1                 | 72.4                | 12.2                      | .785                          | .39                                           | .00                                                           | .677                                                     |
| 4     | 76.1                       | 9.3                 | 71.4                | 14.0                      | .761                          | .12                                           | .56                                                           | .640                                                     |
| 5     | 77.6                       | 5.8                 | 74.7                | 8.7                       | .846                          | 9.06                                          | 2.90                                                          | .758                                                     |
| 6     | Good-fri day.              |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 7     | 78.9                       | 6.5                 | 75.6                | 9.8                       | .871                          | .29                                           | 3.39                                                          | .733                                                     |
| 8     | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 9     | 78.9                       | 7.2                 | 75.3                | 10.8                      | .862                          | .19                                           | .76                                                           | .710                                                     |
| 10    | 78.9                       | 5.7                 | 76.0                | 8.6                       | .882                          | .43                                           | 2.96                                                          | .761                                                     |
| 11    | 79.6                       | 5.0                 | 77.1                | 7.5                       | .913                          | .76                                           | .63                                                           | .788                                                     |
| 12    | 80.2                       | 5.0                 | 77.7                | 7.5                       | .931                          | .94                                           | .67                                                           | .788                                                     |
| 13    | 77.0                       | 6.5                 | 73.7                | 9.8                       | .819                          | 8.78                                          | 3.22                                                          | .732                                                     |
| 14    | 77.3                       | 7.0                 | 73.8                | 10.5                      | .822                          | .78                                           | .50                                                           | .715                                                     |
| 15    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 16    | 78.5                       | 6.9                 | 75.0                | 10.4                      | .854                          | 9.12                                          | .56                                                           | .719                                                     |
| 17    | 75.7                       | 5.8                 | 72.8                | 8.7                       | .795                          | 8.55                                          | 2.76                                                          | .756                                                     |
| 18    | 77.1                       | 4.7                 | 74.7                | 7.1                       | .846                          | 9.10                                          | .30                                                           | .798                                                     |
| 19    | 77.2                       | 4.0                 | 75.2                | 6.0                       | .860                          | .26                                           | 1.95                                                          | .826                                                     |
| 20    | 74.2                       | 2.7                 | 72.8                | 4.1                       | .795                          | 8.64                                          | .22                                                           | .876                                                     |
| 21    | 74.4                       | 3.0                 | 72.9                | 4.5                       | .797                          | .64                                           | .37                                                           | .863                                                     |
| 22    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 23    | 69.0                       | 1.7                 | 68.1                | 2.6                       | .684                          | 7.50                                          | 0.68                                                          | .917                                                     |
| 24    | 71.6                       | 3.3                 | 69.9                | 5.0                       | .725                          | .90                                           | 1.38                                                          | .851                                                     |
| 25    | 75.3                       | 4.2                 | 73.2                | 6.3                       | .806                          | 8.71                                          | .95                                                           | .817                                                     |
| 26    | 78.4                       | 3.1                 | 76.8                | 4.7                       | .905                          | 9.73                                          | .58                                                           | .860                                                     |
| 27    | 78.1                       | 3.4                 | 76.4                | 5.1                       | .893                          | .62                                           | .69                                                           | .851                                                     |
| 28    | 80.1                       | 4.6                 | 77.8                | 6.9                       | .934                          | .99                                           | 2.43                                                          | .804                                                     |
| 29    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 30    | 82.3                       | 5.2                 | 79.7                | 7.8                       | .992                          | 10.55                                         | .94                                                           | .782                                                     |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Height of the Barometer at 32° Fahr. | Range of the Barometer for each hour during the Month. |         |         | Mean Dry Bulb Thermometer. | Range of the Temperature for each hour during the Month. |      |       |
|------------|-------------------------------------------|--------------------------------------------------------|---------|---------|----------------------------|----------------------------------------------------------|------|-------|
|            |                                           | Max.                                                   | Min.    | Diff.   |                            | Max.                                                     | Min. | Diff. |
|            | Inches.                                   | Inches.                                                | Inches. | Inches. | °                          | °                                                        | °    | °     |
| Mid-night. | 29.775                                    | 29.903                                                 | 29.698  | 0.205   | 78.4                       | 82.2                                                     | 69.6 | 12.6  |
| 1          | .765                                      | .859                                                   | .686    | .173    | 78.1                       | 82.2                                                     | 69.1 | 13.1  |
| 2          | .744                                      | .829                                                   | .660    | .169    | 77.5                       | 81.9                                                     | 68.1 | 13.8  |
| 3          | .735                                      | .830                                                   | .646    | .184    | 77.3                       | 81.6                                                     | 68.0 | 13.6  |
| 4          | .730                                      | .835                                                   | .630    | .205    | 76.8                       | 81.0                                                     | 67.6 | 13.4  |
| 5          | .751                                      | .816                                                   | .663    | .183    | 76.7                       | 80.9                                                     | 67.6 | 13.3  |
| 6          | .771                                      | .865                                                   | .686    | .179    | 76.4                       | 81.0                                                     | 68.0 | 13.0  |
| 7          | .793                                      | .889                                                   | .697    | .192    | 77.0                       | 81.8                                                     | 67.8 | 14.0  |
| 8          | .814                                      | .912                                                   | .711    | .201    | 79.3                       | 84.4                                                     | 68.3 | 16.1  |
| 9          | .832                                      | .935                                                   | .720    | .215    | 81.6                       | 87.2                                                     | 66.0 | 21.2  |
| 10         | .837                                      | .935                                                   | .704    | .231    | 83.9                       | 89.2                                                     | 66.9 | 22.3  |
| 11         | .826                                      | .923                                                   | .690    | .233    | 86.4                       | 92.2                                                     | 71.1 | 21.1  |
|            |                                           |                                                        |         |         |                            |                                                          |      |       |
| Noon.      | .801                                      | .899                                                   | .665    | .234    | 88.5                       | 94.6                                                     | 73.4 | 21.2  |
| 1          | .773                                      | .873                                                   | .624    | .249    | 89.3                       | 95.6                                                     | 68.4 | 27.2  |
| 2          | .748                                      | .843                                                   | .610    | .233    | 90.4                       | 96.8                                                     | 70.2 | 26.6  |
| 3          | .720                                      | .813                                                   | .595    | .218    | 90.8                       | 97.7                                                     | 70.4 | 27.3  |
| 4          | .708                                      | .794                                                   | .584    | .210    | 90.2                       | 96.5                                                     | 69.6 | 26.9  |
| 5          | .697                                      | .787                                                   | .593    | .194    | 88.5                       | 95.1                                                     | 68.8 | 26.3  |
| 6          | .708                                      | .798                                                   | .611    | .187    | 85.6                       | 92.6                                                     | 68.8 | 23.8  |
| 7          | .728                                      | .808                                                   | .633    | .175    | 83.1                       | 89.8                                                     | 69.0 | 20.8  |
| 8          | .743                                      | .829                                                   | .651    | .178    | 81.6                       | 87.2                                                     | 68.6 | 18.6  |
| 9          | .770                                      | .855                                                   | .681    | .174    | 80.3                       | 85.0                                                     | 69.5 | 15.5  |
| 10         | .779                                      | .851                                                   | .693    | .158    | 79.5                       | 83.4                                                     | 70.0 | 13.4  |
| 11         | .779                                      | .847                                                   | .693    | .154    | 78.9                       | 82.4                                                     | 69.7 | 12.7  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.     | Mean Wet Bulb Thermometer, |      | Computed Dew Point. |      | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a Cubic foot of Air. | Additional Weight of Vapour required for complete saturation. | Mean degree of Humidity complete saturation being unity. |
|-----------|----------------------------|------|---------------------|------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------|
|           | o                          | o    | o                   | o    |                           |                               |                                               |                                                               |                                                          |
| Midnight. | 75.9                       | 2.5  | 74.6                | 3.8  | .843                      | 9.13                          | 1.18                                          | 0.886                                                         |                                                          |
|           | 75.7                       | 2.4  | 74.5                | 3.6  | .840                      | .11                           | .11                                           | .891                                                          |                                                          |
|           | 75.3                       | 2.2  | 74.2                | 3.3  | .832                      | .04                           | .00                                           | .900                                                          |                                                          |
|           | 75.4                       | 1.9  | 74.4                | 2.9  | .838                      | .10                           | 0.88                                          | .912                                                          |                                                          |
|           | 75.0                       | 1.8  | 74.1                | 2.7  | .830                      | .02                           | .81                                           | .918                                                          |                                                          |
|           | 74.8                       | 1.9  | 73.8                | 2.9  | .822                      | 8.93                          | .87                                           | .911                                                          |                                                          |
|           | 74.7                       | 1.7  | 73.8                | 2.6  | .822                      | .93                           | .79                                           | .919                                                          |                                                          |
|           | 75.3                       | 1.7  | 74.4                | 2.6  | .838                      | 9.10                          | .79                                           | .920                                                          |                                                          |
|           | 76.7                       | 2.6  | 75.4                | 3.9  | .865                      | .35                           | 1.24                                          | .883                                                          |                                                          |
|           | 77.4                       | 4.2  | 75.3                | 6.3  | .862                      | .29                           | 2.05                                          | .819                                                          |                                                          |
|           | 78.0                       | 5.9  | 75.0                | 8.9  | .854                      | .14                           | .99                                           | .754                                                          |                                                          |
|           | 78.9                       | 7.5  | 75.1                | 11.3 | .857                      | .13                           | 3.93                                          | .699                                                          |                                                          |
| Noon.     | 79.3                       | 9.2  | 74.7                | 13.8 | .846                      | 8.97                          | 4.91                                          | .646                                                          |                                                          |
|           | 79.1                       | 10.2 | 74.0                | 15.3 | .827                      | .77                           | 5.44                                          | .617                                                          |                                                          |
|           | 79.4                       | 11.0 | 73.9                | 16.5 | .824                      | .70                           | .97                                           | .593                                                          |                                                          |
|           | 79.4                       | 11.4 | 73.7                | 17.1 | .819                      | .66                           | 6.18                                          | .584                                                          |                                                          |
|           | 79.3                       | 10.9 | 73.8                | 16.4 | .822                      | .69                           | 5.90                                          | .596                                                          |                                                          |
|           | 78.6                       | 9.9  | 73.6                | 14.9 | .817                      | .66                           | .22                                           | .624                                                          |                                                          |
|           | 78.2                       | 7.4  | 74.5                | 11.1 | .840                      | .98                           | 3.78                                          | .704                                                          |                                                          |
|           | 77.2                       | 5.9  | 74.2                | 8.9  | .832                      | .93                           | 2.93                                          | .753                                                          |                                                          |
|           | 76.8                       | 4.8  | 74.4                | 7.2  | .838                      | 9.02                          | .32                                           | .795                                                          |                                                          |
|           | 76.5                       | 3.8  | 74.6                | 5.7  | .843                      | .09                           | 1.82                                          | .833                                                          |                                                          |
|           | 76.3                       | 3.2  | 74.7                | 4.8  | .846                      | .14                           | .52                                           | .857                                                          |                                                          |
|           | 76.1                       | 2.8  | 74.7                | 4.2  | .846                      | .16                           | .31                                           | .875                                                          |                                                          |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1855.*

Solar radiation, Weather, &amp;c.

| Date. | Max. Solar radiation. | Rain.                                | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                                    |
|-------|-----------------------|--------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------|
| 1     | o                     | Inches.<br>0.14                      | ...                               |                                                                                                               |
| 2     | 145.0                 | S. or S. W.                          |                                   | Cloudless till 10 A. M. scattered $\backslash$ i or $\cap$ i or $\wedge$ i till 8 P. M. cloudless afterwards. |
| 3     | 151.9                 | W. or S.                             |                                   | Cloudless till 7 A. M. scattered $\backslash$ i till 1 P. M. cloudless afterwards.                            |
| 4     | 151.7                 | S. or N. E.                          |                                   | Cloudless.                                                                                                    |
| 5     | 144.2                 | S. or S. E.                          |                                   | Cloudless till 8 A. M. scattered $\backslash$ i and $\wedge$ i till 7 P. M. cloudless afterwards.             |
| 6     | Good-fri day.         | ...                                  |                                   |                                                                                                               |
| 7     | 135.7                 | S. or S. W.                          |                                   | Cloudless till 5 A. M. scattered $\cap$ i or $\wedge$ i till 5 P. M. cloudless afterwards.                    |
| 8     | Sunday.               | ...                                  |                                   |                                                                                                               |
| 9     | 153.5                 | S. S. E. or S. or S. W.              |                                   | More or less cloudy till 4 P. M. cloudless afterwards.                                                        |
| 10    | 139.0                 | S. or S. E.                          |                                   | Cloudless.                                                                                                    |
| 11    | 133.4                 | S. E. or S.                          |                                   | Cloudless till 7 A. M. various clouds till 7 P. M. cloudless afterwards.                                      |
| 12    | 140.0                 | S.                                   |                                   | Cloudless till 5 A. M. more or less cloudy afterwards.                                                        |
| 13    | 129.4                 | S. or N. E. or S. E.                 |                                   | Cloudy till 6 P. M. cloudless afterwards.                                                                     |
| 14    | 143.0                 | Calm or S. E.                        |                                   | Cloudless till 4 A. M. various clouds till 8 P. M. cloudless afterwards.                                      |
| 15    | Sunday.               | ...                                  |                                   |                                                                                                               |
| 16    | 133.6                 | S. or N. E.                          |                                   | Cloudless till 5 A. M. scattered $\backslash$ i till 5 P. M. cloudless afterwards.                            |
| 17    | 133.8                 | 0.14 N. E. or S. E.                  |                                   | More or less cloudy the whole day.                                                                            |
| 18    | 133.0                 | S. E. or N. W. or S.                 |                                   | Cloudless till 4 A. M. more or less cloudy afterwards, also drizzling at 8 P. M.                              |
| 19    | ..                    | S. or S. W.                          |                                   | Cloudy nearly the whole day. Also drizzling from 2 P. M. to 4 P. M.                                           |
| 20    | 120.0                 | 0.65 S. or S. E.                     |                                   | Cloudy and constantly drizzling.                                                                              |
| 21    | ..                    | 0.36 S. or S. E.                     |                                   | Cloudy, also raining from 4 P. M. to 8 P. M.                                                                  |
| 22    | Sunday.               | 2.20                                 | ...                               |                                                                                                               |
| 23    | ..                    | E. or S. E. or S. W.<br>[or S. S. W. |                                   | Scattered $\backslash$ i till 6 A. M. cloudy afterwards, also drizzling between 9 and 10 A. M.                |
| 24    | 125.0                 | s. w. or N. W. or S. E.              |                                   | Various clouds the whole day.                                                                                 |
| 25    | 128.2                 | S. E. or S.                          |                                   | Cloudless till 7 A. M. scattered $\cap$ i or $\wedge$ i afterwards.                                           |
| 26    | ..                    | 0.34 S. or E. or S. W.               |                                   | Cloudy till 7 P. M. cloudless afterwards.                                                                     |
| 27    | 136.0                 | S. E. or N. E. or W. or N.           |                                   | More or less cloudy till 6 P. M. cloudless afterwards.                                                        |
| 28    | 135.5                 | E. or N. E.                          |                                   | Cloudless till 2 A. M. cloudy till 6 P. M. cloudless afterwards.                                              |
| 29    | Sunday.               | ...                                  |                                   |                                                                                                               |
| 30    | 134.0                 | S. E. or S.                          |                                   | Cloudy till 10 A. M. cloudless afterwards.                                                                    |

$\backslash$ i Cirri,  $\wedge$ i Cirro-strati,  $\cap$ i Cumuli,  $\wedge$ i Cumulo-strati,  $\wedge$ i Nimbi,  $\cap$ i Strati,  $\wedge$ i Cirro-cumuli.

Meteorological Observations kept at the Residency, Lucknow. Lat. 26°51'.18, Long. 81, for the Month of October, 1854.

| Date.  | At 6 A. M.                |           | At 9 A. M.                |           | Noon.                     |           | Force and direction of Wind. |                | Aspect of Sky. |        | Aspect of Sky. |               |    |
|--------|---------------------------|-----------|---------------------------|-----------|---------------------------|-----------|------------------------------|----------------|----------------|--------|----------------|---------------|----|
|        | Thermometer.<br>Wet Bulb. | Dry Bulb. | Thermometer.<br>Wet Bulb. | Dry Bulb. | Thermometer.<br>Wet Bulb. | Dry Bulb. | S. E. It.                    | Clear.         | S. E. It.      | Clear. | S. E. It.      | Clear.        |    |
| 1      | 77                        | .79       | 29.78                     | Calm.     | 77                        | .83       | 29.86                        | S. E. It.      | 77             | .85    | .82            | Clear.        |    |
| 2      | 76                        | .78       | .80                       | Ditto.    | 77                        | .85       | .95                          | S. E. It.      | 76             | .85    | .92            | Ditto.        |    |
| 3      | 75                        | .77       | .85                       | S. E. It. | 77                        | .84       | .96                          | S. It.         | 75             | .86    | .92            | S. E. It.     |    |
| 4      | 75                        | .77       | .90                       | Ditto.    | 78                        | .85       | .96                          | S. E. It.      | 75             | .86    | .92            | Cumuli.       |    |
| 5      | 77                        | .81       | .90                       | Ditto.    | 79                        | .86       | .96                          | S. E. It.      | 78             | .86    | .92            | Cumuli.       |    |
| 6      | 78                        | .80       | .88                       | Ditto.    | 79                        | .86       | .96                          | S. E. It.      | 79             | .86    | .92            | Cumulo-strat. |    |
| 7      | 77                        | .79       | .82                       | Ditto.    | 77                        | .80       | .90                          | N. W. It.      | 80             | .84    | .87            | S. E. It.     |    |
| 8      | 78                        | .77       | .82                       | E. It.    | 77                        | .80       | .88                          | N. W. It.      | 78             | .86    | .96            | S. E. It.     |    |
| 9      | 77                        | .80       | .92                       | E. It.    | 82                        | .83       | .96                          | S. E. It.      | 80             | .86    | .96            | Cumuli.       |    |
| 10     | 78                        | .80       | .94                       | S. E. It. | 77                        | .79       | .79                          | Clear.         | 79             | .87    | .92            | Cumuli.       |    |
| 11     | 78                        | .80       | .94                       | S. E. It. | 77                        | .79       | .79                          | Clear.         | 79             | .87    | .92            | Cumuli.       |    |
| 12     | 76                        | .80       | .98                       | Ditto.    | 77                        | .80       | .80                          | Clear.         | 77             | .80    | .80            | Clear.        |    |
| 13     | 73                        | .77       | .90                       | S. W. It. | 75                        | .82       | .80                          | W. It.         | 73             | .85    | .80            | W. It.        |    |
| 14     | 73                        | .75       | .94                       | W. It.    | 75                        | .82       | .80                          | W. It.         | 71             | .84    | .80            | Ditto.        |    |
| 15     | 70                        | .75       | .98                       | Ditto.    | 75                        | .82       | .80                          | W. It.         | 66             | .81    | .80            | Ditto.        |    |
| 16     | 65                        | .72       | .94                       | Ditto.    | 65                        | .77       | .70                          | W. It.         | 65             | .81    | .80            | Ditto.        |    |
| 17     | 63                        | .69       | .92                       | Ditto.    | 66                        | .75       | .29                          | W. It.         | 65             | .81    | .80            | Ditto.        |    |
| 18     | 63                        | .70       | .92                       | Ditto.    | 66                        | .75       | .30                          | N. W. It.      | 65             | .81    | .80            | Ditto.        |    |
| 19     | 65                        | .69       | .86                       | Ditto.    | 68                        | .77       | .02                          | N. W. It.      | 65             | .81    | .80            | Ditto.        |    |
| 20     | 66                        | .69       | .92                       | Ditto.    | 67                        | .78       | .05                          | E. It.         | 65             | .81    | .80            | Ditto.        |    |
| 21     | 70                        | .73       | .98                       | S. E. It. | 70                        | .78       | .05                          | Clear.         | 70             | .83    | .80            | Clear.        |    |
| 22     | 70                        | .73       | .98                       | S. E. It. | 70                        | .78       | .05                          | Clear.         | 70             | .83    | .80            | Clear.        |    |
| 23     | 70                        | .75       | .98                       | Ditto.    | 70                        | .78       | .05                          | Clear.         | 70             | .83    | .80            | Clear.        |    |
| 24     | ..                        | ..        | S. E. It.                 | Clear.    | 70                        | .79       | .30                          | S. E. It.      | 68             | .82    | .80            | S. E. It.     |    |
| 25     | 69                        | .74       | .30                       | Ditto.    | 65                        | .76       | .02                          | Ditto.         | 65             | .81    | .80            | Ditto.        |    |
| 26     | 65                        | .71       | .95                       | W. It.    | 62                        | .73       | .30                          | W. It.         | 61             | .80    | .29            | W. It.        |    |
| 27     | 62                        | .70       | .90                       | Ditto.    | 64                        | .72       | .30                          | S. W. It.      | 65             | .79    | .30            | S. W. It.     |    |
| 28     | 59                        | .68       | .95                       | Ditto.    | 64                        | .72       | .30                          | S. W. It.      | 68             | .80    | .30            | [strati.]     |    |
| 29     | 61                        | .66       | .30                       | S. W. It. | 67                        | .76       | .30                          | S. E. It.      | 68             | .80    | .30            | Cirro-cumuli. |    |
| 30     | 64                        | .68       | .30                       | S. E. It. | 71                        | .74       | .30                          | Ditto.         | 71             | .73    | .30            | Heavy rain.   |    |
| 31     | 70                        | .74       | .05                       | Ditto.    | ..                        | ..        | ..                           | Strati : rain. | ..             | ..     | ..             | ..            |    |
| Total. | 1897                      | 2006      | 2118                      | ..        | ..                        | 1353      | 1494                         | 955            | ..             | 1292   | 1488           | .853          | .. |
| Avege. | 70.259                    | 74.296    | 29.784                    | ..        | ..                        | 71.210    | 78.632                       | 29.526         | ..             | 71.777 | 82.666         | 29.474        | .. |

Meteorological Observations kept at the Residency, Lucknow Lat. 26°51'18", Long. 81, for the Month of October, 1854.

| At 3 p. m.   |                              |           |                | At 6 p. m.     |           |             |                              | Remarks.       |                    |     |         |
|--------------|------------------------------|-----------|----------------|----------------|-----------|-------------|------------------------------|----------------|--------------------|-----|---------|
| Thermometer. | Force and direction of Wind. |           | Aspect of Sky. | Thermometer.   |           | Baro-meter. | Force and direction of Wind. | Aspect of Sky. | Rain Gauge Inches. |     |         |
|              | Wet Bulb.                    | Dry Bulb. |                | Wet Bulb.      | Dry Bulb. |             |                              |                |                    |     |         |
| 76           | 80                           | .80       | S. E. It.      | Clear,         | ..        | ..          | ..                           | ..             | ..                 | ..  | ....    |
| 76           | ..                           | .84       | S. E. It.      | ... ..         | ..        | 76          | .85                          | ..             | ..                 | ..  | ....    |
| 75           | 87                           | .85       | S. E. It.      | Cumuli.        | ..        | 75          | .85                          | .84            | S. E. It.          | ..  | Clear.  |
| 77           | 87                           | .92       | Ditto.         | Ditto.         | ..        | 75          | .84                          | Ditto.         | Ditto.             | ..  | Ditto.  |
| 77           | 81                           | .82       | S. E.          | Strati : rain. | ..        | ..          | ..                           | ..             | ..                 | ..  | ....    |
| ..           | ..                           | ..        | ..             | .. ..          | ..        | 76          | ..                           | ..             | Rain, thunder.     | 0.5 | Shower. |
| 80           | 86                           | .92       | S. E. It.      | Cumuli.        | ..        | ..          | ..                           | ..             | ..                 | 1.2 | ..      |
| ..           | ..                           | ..        | ..             | .. ..          | ..        | 80          | .85                          | .92            | ..                 | ..  | ..      |
| ..           | ..                           | ..        | ..             | .. ..          | ..        | 80          | .86                          | .96            | S. E. It.          | ..  | ..      |
| ..           | ..                           | ..        | ..             | .. ..          | ..        | ..          | ..                           | ..             | ..                 | ..  | ..      |
| 73           | 85                           | .95       | S. W. It.      | Clear,         | .. ..     | 76          | .85                          | .88            | S. W. It.          | ..  | Clear.  |
| ..           | ..                           | ..        | ..             | .. ..          | ..        | 74          | .85                          | .94            | W. It.             | ..  | Ditto.  |
| ..           | ..                           | ..        | ..             | .. ..          | ..        | 74          | .83                          | 30.            | Ditto.             | ..  | Ditto.  |
| 66           | 82                           | .98       | W. It.         | Clear.         | .. ..     | ..          | ..                           | ..             | ..                 | ..  | ..      |
| 68           | 82                           | .95       | Ditto.         | Ditto.         | .. ..     | 71          | .80                          | .98            | W. It.             | ..  | ..      |
| 66           | 82                           | .95       | W. It.         | Clear,         | .. ..     | 68          | .79                          | .94            | W. It.             | ..  | ..      |
| 67           | 80                           | .94       | N. W. It.      | Ditto.         | .. ..     | ..          | ..                           | ..             | ..                 | ..  | ..      |
| ..           | ..                           | ..        | ..             | .. ..          | ..        | 72          | ..                           | ..             | ..                 | ..  | ..      |
| ..           | ..                           | ..        | ..             | .. ..          | ..        | ..          | ..                           | ..             | ..                 | ..  | ..      |
| 69           | 83                           | 30.       | S. E. It.      | Cumuli.        | .. ..     | ..          | ..                           | ..             | ..                 | ..  | ..      |
| ..           | ..                           | ..        | ..             | .. ..          | ..        | 69          | .81                          | .98            | S. E. It.          | ..  | ..      |
| ..           | ..                           | ..        | ..             | .. ..          | ..        | ..          | ..                           | ..             | ..                 | ..  | ..      |
| 63           | 79                           | 30.04     | S. W. It.      | Clear.         | .. ..     | 64          | .76                          | .95            | W. It.             | ..  | ..      |
| 65           | 79                           | .06       | S. It.         | Ditto.         | .. ..     | 66          | .77                          | 30.20          | S. W. It.          | ..  | ..      |
| 69           | 80                           | .04       | S. E. It.      | Cirro-Cumuli.  | .. ..     | ..          | ..                           | ..             | ..                 | ..  | ..      |
| 70           | 73                           | 29.98     | E. F.          | Heavy rain.    | .. ..     | ..          | ..                           | ..             | ..                 | ..  | ..      |
| 1137         | 13.3                         | 1124      | ..             | .. ..          | .. ..     | 1063        | 1225                         | 1057           | ..                 | ..  | ..      |
| 71.03        | 82.063                       | 29.703    | ..             | .. ..          | .. ..     | 72.867      | 81.667                       | 29.705         | ..                 | ..  | ..      |
|              |                              |           |                |                |           |             |                              |                | 1.25               | ..  | ..      |

*Abstract of the Meteorological Register for October, 1854.**Lucknow, 1st November, 1854.*

| Thermometer<br>6 A. M. | Thermometer<br>9 A. M. | Thermometer<br>Noon. | Thermometer<br>3 P. M. | Thermometer<br>6 P. M. | Thermometer<br>Mid. | Remarks.                                                             |
|------------------------|------------------------|----------------------|------------------------|------------------------|---------------------|----------------------------------------------------------------------|
| Wet.,.                 | 78 59                  | 70.259               | 82                     | 71.210                 | 80 0 61 0           | 71.777                                                               |
| Dry.,.                 | 81                     | 66                   | 74.296                 | 85                     | 78.632              | 87 0 73 0                                                            |
|                        |                        |                      |                        |                        |                     | 8826 66 87.0 73.0                                                    |
|                        |                        |                      |                        |                        |                     | 82.063 86.0 76.0 \| 81.667                                            |
|                        |                        |                      |                        |                        |                     | The weather pretty fair, and pleasant. The rain fell on 3 days only. |
|                        |                        |                      |                        |                        |                     | Mean temperature of the month, Wet Bulb, . . . 71.435.               |
|                        |                        |                      |                        |                        |                     | Dry, . . . 79.865.                                                   |
| 30.02                  | 29.80                  | Maximum.             | Mid.                   | Minimum.               | Mid.                |                                                                      |
| 30.06                  | 29.80                  | Maximum.             | Mid.                   | Minimum.               | Mid.                |                                                                      |
| 29.703                 | 29.705                 | Maximum.             | Barometer<br>3 P. M.   | Barometer<br>6 P. M.   | Barometer<br>Mid.   |                                                                      |
| 29.474                 | 29.705                 | Mid.                 |                        |                        |                     |                                                                      |
| 30.08                  | 29.82                  | Maximum.             | Mid.                   | Minimum.               | Mid.                |                                                                      |
| 29.526                 | 29.79                  | Minimum.             | Mid.                   | Maximum.               | Mid.                |                                                                      |
| 30.10                  | 29.784                 | Maximum.             | Mid.                   | Minimum.               | Mid.                |                                                                      |
| 30.05                  | 29.78                  | Maximum.             | Mid.                   | Minimum.               | Mid.                |                                                                      |
|                        |                        |                      |                        |                        |                     |                                                                      |

*Meteorological Observations kept at the Residency, Lucknow. Nat. 26-51-18, Long. 81, for the Month of December, 1854.*

Meteorological Observations kept at the Residency, Lucknow Lat. 26°51'18", Long. 81, for the Month of December, 1854.

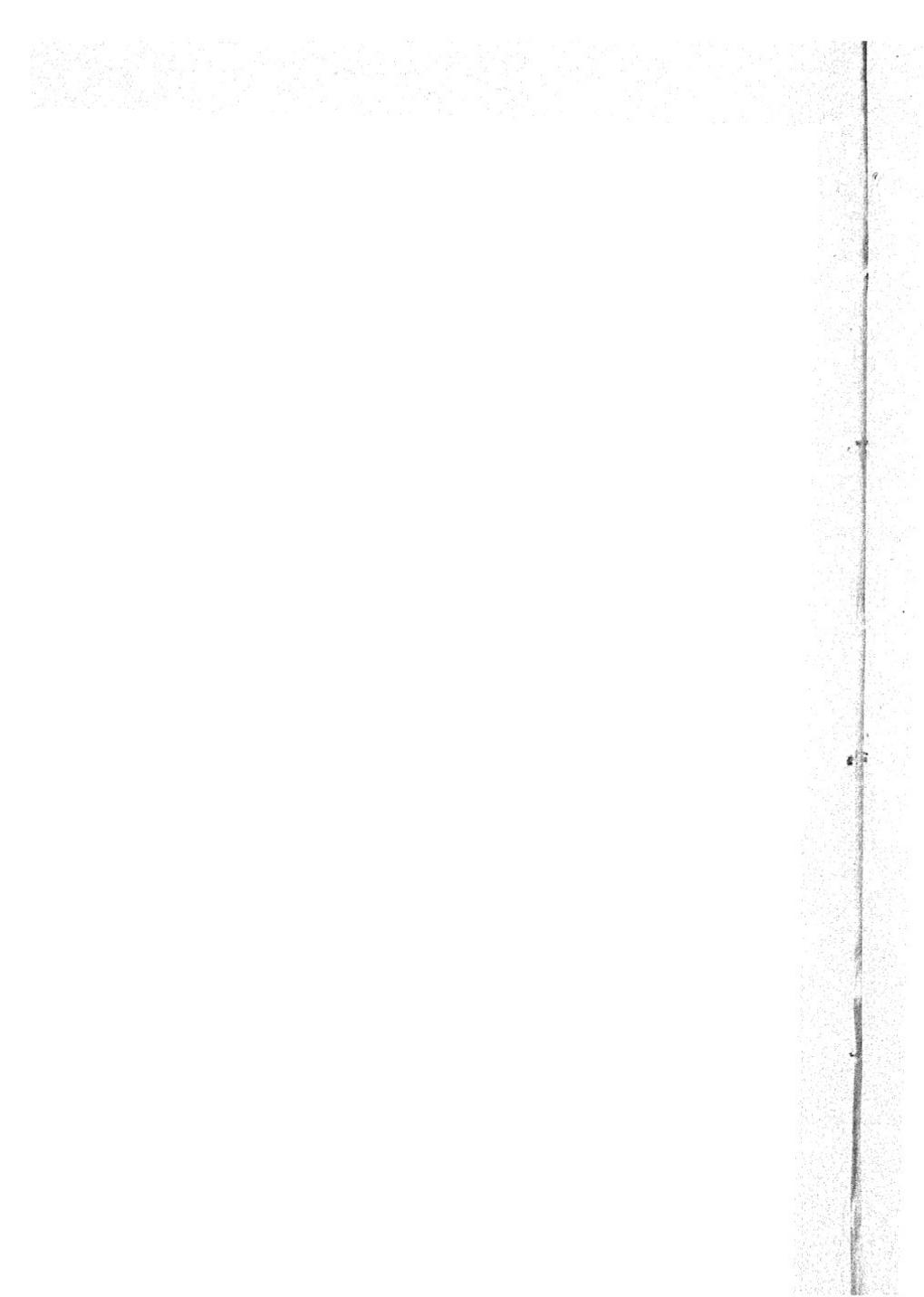
| At 3 P. M.                |                           |                                    |                   | At 6 P. M.                |                           |                 |                   |
|---------------------------|---------------------------|------------------------------------|-------------------|---------------------------|---------------------------|-----------------|-------------------|
| Thermometer,<br>Wet Bulb. | Thermometer,<br>Dry Bulb. | Force and<br>direction of<br>Wind. | Aspect of<br>Sky. | Thermometer,<br>Wet Bulb. | Thermometer,<br>Dry Bulb. | Baro-<br>meter. | Aspect of<br>Sky. |
| ..                        | ..                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| 62                        | 70                        | 30.12                              | W. It.            | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | ..                                 | Clear.            | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | .15                                | S. E. It.         | ..                        | ..                        | ..              | ..                |
| 60                        | 68                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| 58                        | 68                        | .12                                | S. It.            | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| 59                        | 69                        | .22                                | W. It.            | ..                        | ..                        | ..              | ..                |
| 63                        | 72                        | .15                                | W. fresh.         | ..                        | ..                        | ..              | ..                |
| 60                        | 70                        | .1                                 | W.                | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| 55                        | 68                        | .11                                | W. F.             | ..                        | ..                        | ..              | ..                |
| 65                        | 67                        | .12                                | ..                | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| 56                        | 67                        | .08                                | S. W. It.         | ..                        | ..                        | ..              | ..                |
| 59                        | 66                        | .12                                | S. E. It.         | ..                        | ..                        | ..              | ..                |
| 59                        | 67                        | .08                                | Ditto.            | ..                        | ..                        | ..              | ..                |
| 59                        | 67                        | .08                                | Ditto.            | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| 58                        | 69                        | .12                                | ..                | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| 56                        | 68                        | .08                                | W. It.            | ..                        | ..                        | ..              | ..                |
| ..                        | ..                        | ..                                 | ..                | ..                        | ..                        | ..              | ..                |
| 58                        | 70                        | .7                                 | S. E.             | ..                        | ..                        | ..              | ..                |
| 59                        | 69                        | .5                                 | Ditto.            | ..                        | ..                        | ..              | ..                |
| 57                        | 68                        | .4                                 | Ditto.            | ..                        | ..                        | ..              | ..                |
| 58                        | 67                        | .3                                 | S. It.            | ..                        | ..                        | ..              | ..                |
| 991                       | 1163                      | .167                               | ..                | ..                        | ..                        | ..              | ..                |
| 68.294                    | 68.412                    | 30.982                             | ..                | ..                        | ..                        | ..              | ..                |
|                           |                           |                                    |                   | 314                       | 334                       | .30             | ..                |
|                           |                           |                                    |                   |                           | 62,800                    | 66,800          | 30,600            |

*Abstract of the Meteorological Register for December, 1854.*

Lucknow, 1st January, 1855.

*Meteorological Register kept at Lucknow.*

| Thermometer<br>6 A. M. | Thermometer<br>9 A. M. | Thermometer<br>Noon. | Thermometer<br>3 P. M. | Thermometer<br>6 P. M. | Remarks.                                                                                                                                                                                                                                             |
|------------------------|------------------------|----------------------|------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 30.18                  | Maxim.                 | Mid.                 | Mid.                   | Mid.                   | The prevailing winds this month, S. and S. E., but frequently variable. The weather pretty clear, now and then hazy and cloudy. No rain during the month. Mean temperature of the month.<br>Web Bulb, . . . . . 58.206.<br>Dry do, . . . . . 64.637. |
| 29.96                  | Minim.                 | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                      |
| 30.07                  | Maxim.                 | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                      |
| 30.08                  | Minim.                 | Mid.                 | Mid.                   | Mid.                   |                                                                                                                                                                                                                                                      |
| 30.30                  | Maxim.                 | Mid.                 | Mid.                   | Barometer<br>9 A. M.   |                                                                                                                                                                                                                                                      |
| 30.40                  | Maxim.                 | Mid.                 | Mid.                   | Barometer<br>9 A. M.   |                                                                                                                                                                                                                                                      |
| 30.10                  | Minim.                 | Mid.                 | Mid.                   | Barometer<br>Noon.     |                                                                                                                                                                                                                                                      |
| 30.131                 | Maxim.                 | Mid.                 | Mid.                   | Barometer<br>3 P. M.   |                                                                                                                                                                                                                                                      |
| 30.70                  | Minim.                 | Mid.                 | Mid.                   | Barometer<br>6 P. M.   |                                                                                                                                                                                                                                                      |
| 30.89                  | Maxim.                 | Mid.                 | Mid.                   | Barometer<br>6 P. M.   |                                                                                                                                                                                                                                                      |
| 30.0.0                 | Minim.                 | Mid.                 | Mid.                   | Barometer<br>6 P. M.   |                                                                                                                                                                                                                                                      |
| 30.60                  | Mid.                   | Mid.                 | Mid.                   | Barometer<br>6 P. M.   |                                                                                                                                                                                                                                                      |



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1855.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

Height of the cistern of the Standard Barometer above the level of the Sea, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of the Barometer at $32^{\circ}$ Fahr. | Range of the Barometer during the day. |                   |                  | Mean Dry Bulb Thermometer. | Range of the Temperature during the day. |           |           |
|-------|----------------------------------------------------|----------------------------------------|-------------------|------------------|----------------------------|------------------------------------------|-----------|-----------|
|       |                                                    | Max.                                   | Min.              | Diff.            |                            | Max.                                     | Min.      | Diff.     |
| 1     | Inches.<br>29.649                                  | Inches.<br>29.723                      | Inches.<br>29.566 | Inches.<br>.0157 | °<br>87.8                  | °<br>97.7                                | °<br>81.4 | °<br>16.3 |
| 2     | .634                                               | .692                                   | .577              | .115             | 87.5                       | 96.6                                     | 80.6      | 16.0      |
| 3     | .722                                               | .789                                   | .647              | .142             | 86.4                       | 92.9                                     | 81.6      | 11.3      |
| 4     | .757                                               | .828                                   | .676              | .152             | 86.3                       | 92.8                                     | 82.2      | 10.6      |
| 5     | .681                                               | .719                                   | .596              | .153             | 85.8                       | 91.9                                     | 80.6      | 11.3      |
| 6     | Sunday.                                            |                                        |                   |                  |                            |                                          |           |           |
| 7     | .618                                               | .682                                   | .556              | .126             | 87.4                       | 95.4                                     | 82.6      | 12.8      |
| 8     | .654                                               | .721                                   | .579              | .142             | 87.1                       | 92.8                                     | 83.3      | 9.5       |
| 9     | .736                                               | .791                                   | .691              | .100             | 86.4                       | 92.9                                     | 82.2      | 10.7      |
| 10    | .687                                               | .733                                   | .562              | .171             | 84.6                       | 91.2                                     | 77.8      | 13.4      |
| 11    | .631                                               | .689                                   | .593              | .096             | 85.2                       | 91.0                                     | 80.2      | 10.8      |
| 12    | .649                                               | .717                                   | .596              | .121             | 84.9                       | 88.9                                     | 80.7      | 8.2       |
| 13    | Sunday.                                            |                                        |                   |                  |                            |                                          |           |           |
| 14    | .701                                               | .781                                   | .620              | .161             | 87.8                       | 94.6                                     | 83.0      | 11.6      |
| 15    | .714                                               | .753                                   | .641              | .112             | 83.2                       | 94.4                                     | 72.3      | 22.1      |
| 16    | .738                                               | .805                                   | .658              | .147             | 81.0                       | 89.9                                     | 73.6      | 16.3      |
| 17    | .721                                               | .791                                   | .640              | .151             | 83.3                       | 93.6                                     | 74.9      | 18.7      |
| 18    | .647                                               | .731                                   | .515              | .216             | 83.4                       | 93.3                                     | 73.6      | 19.7      |
| 19    | .549                                               | .601                                   | .476              | .125             | 87.3                       | 94.4                                     | 81.2      | 13.2      |
| 20    | Sunday.                                            |                                        |                   |                  |                            |                                          |           |           |
| 21    | .640                                               | .695                                   | .587              | .108             | 88.2                       | 95.4                                     | 82.0      | 13.4      |
| 22    | .642                                               | .720                                   | .580              | .140             | 88.5                       | 97.4                                     | 82.3      | 15.1      |
| 23    | .624                                               | .702                                   | .557              | .145             | 90.0                       | 98.1                                     | 83.3      | 14.8      |
| 24    | .605                                               | .681                                   | .492              | .189             | 89.7                       | 100.1                                    | 80.4      | 19.7      |
| 25    | .581                                               | .655                                   | .497              | .158             | 87.4                       | 97.2                                     | 79.4      | 17.8      |
| 26    | .598                                               | .664                                   | .535              | .129             | 88.2                       | 97.5                                     | 81.6      | 15.9      |
| 27    | Sunday.                                            |                                        |                   |                  |                            |                                          |           |           |
| 28    | .503                                               | .590                                   | .424              | .166             | 77.5                       | 81.2                                     | 75.0      | 6.2       |
| 29    | .594                                               | .672                                   | .508              | .164             | 82.3                       | 89.5                                     | 74.0      | 15.5      |
| 30    | .663                                               | .720                                   | .614              | .106             | 84.7                       | 92.4                                     | 78.2      | 14.2      |
| 31    | .600                                               | .661                                   | .529              | .132             | 87.2                       | 92.9                                     | 83.3      | 9.6       |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1855.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Date. | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a Cubic foot of Air. | Additional weight of vapour required for complete saturation. | Mean degree of Humidity complete saturation being unity. |
|-------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------|
| 1     | o<br>82.3                  | o<br>5.5            | o<br>79.5           | o<br>8.3                  | 0.986                         | 10.49                                         | 3.11                                                          | 0.771                                                    |
| 2     | 82.4                       | 5.1                 | 79.8                | 7.7                       | .995                          | .58                                           | 2.91                                                          | .784                                                     |
| 3     | 81.9                       | 4.5                 | 79.6                | 6.8                       | .989                          | .54                                           | .52                                                           | .807                                                     |
| 4     | 81.3                       | 5.0                 | 78.8                | 7.5                       | .964                          | .27                                           | .75                                                           | .789                                                     |
| 5     | 81.2                       | 4.6                 | 78.9                | 6.9                       | .967                          | .32                                           | .51                                                           | .804                                                     |
| 6     | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 7     | 82.3                       | 5.1                 | 79.7                | 7.7                       | .992                          | .55                                           | .90                                                           | .784                                                     |
| 8     | 81.7                       | 5.4                 | 79.0                | 8.1                       | .970                          | .33                                           | 3.00                                                          | .775                                                     |
| 9     | 81.5                       | 4.9                 | 79.0                | 7.4                       | .970                          | .35                                           | 2.71                                                          | .793                                                     |
| 10    | 80.6                       | 4.0                 | 78.6                | 6.0                       | .958                          | .26                                           | .13                                                           | .828                                                     |
| 11    | 81.2                       | 4.0                 | 79.2                | 6.0                       | .976                          | .43                                           | .18                                                           | .827                                                     |
| 12    | 81.1                       | 3.8                 | 79.2                | 5.7                       | .976                          | .43                                           | .06                                                           | .835                                                     |
| 13    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 14    | 82.4                       | 5.4                 | 79.7                | 8.1                       | .992                          | .55                                           | 3.05                                                          | .776                                                     |
| 15    | 78.1                       | 5.1                 | 75.5                | 7.7                       | .868                          | 9.31                                          | 2.58                                                          | .783                                                     |
| 16    | 77.5                       | 3.5                 | 75.7                | 5.3                       | .873                          | .41                                           | 1.73                                                          | .845                                                     |
| 17    | 78.8                       | 4.5                 | 76.5                | 6.8                       | .896                          | .61                                           | 2.32                                                          | .806                                                     |
| 18    | 78.9                       | 4.5                 | 76.6                | 6.8                       | .899                          | .63                                           | .33                                                           | .805                                                     |
| 19    | 82.7                       | 4.6                 | 80.4                | 6.9                       | 1.014                         | 10.79                                         | .62                                                           | .805                                                     |
| 20    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 21    | 82.8                       | 5.4                 | 80.1                | 8.1                       | .005                          | .67                                           | 3.09                                                          | .775                                                     |
| 22    | 83.3                       | 5.2                 | 80.7                | 7.8                       | .024                          | .86                                           | .02                                                           | .782                                                     |
| 23    | 83.7                       | 6.3                 | 80.5                | 9.5                       | .017                          | .76                                           | .74                                                           | .742                                                     |
| 24    | 83.1                       | 6.6                 | 79.8                | 9.9                       | 0.995                         | .54                                           | .83                                                           | .733                                                     |
| 25    | 82.3                       | 5.1                 | 79.7                | 7.7                       | .992                          | .55                                           | 2.90                                                          | .784                                                     |
| 26    | 82.7                       | 5.5                 | 79.9                | 8.3                       | .998                          | .61                                           | 3.15                                                          | .771                                                     |
| 27    | Sunday.                    |                     |                     |                           |                               |                                               |                                                               |                                                          |
| 28    | 76.5                       | 1.0                 | 76.0                | 1.5                       | .882                          | 9.56                                          | 0.48                                                          | .952                                                     |
| 29    | 78.8                       | 3.5                 | 77.0                | 5.3                       | .910                          | .79                                           | 1.79                                                          | .815                                                     |
| 30    | 81.7                       | 3.0                 | 80.2                | 4.5                       | 1.008                         | 10.77                                         | .65                                                           | .867                                                     |
| 31    | 84.0                       | 3.2                 | 82.4                | 4.8                       | .080                          | 11.49                                         | .88                                                           | .859                                                     |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Height of the Barometer at 32° Fahr. | Range of the Barometer for each hour during the Month. |         |         | Mean Dry Bulb Thermometer. | Range of the Temperature for each hour during the Month. |      |       |
|------------|-------------------------------------------|--------------------------------------------------------|---------|---------|----------------------------|----------------------------------------------------------|------|-------|
|            |                                           | Max.                                                   | Min.    | Diff.   |                            | Max.                                                     | Min. | Diff. |
|            | Inches.                                   | Inches.                                                | Inches. | Inches. | °                          | °                                                        | °    | °     |
| Mid-night. | 29.658                                    | 29.754                                                 | 29.543  | 0.211   | 82.3                       | 86.5                                                     | 74.2 | 12.3  |
| 1          | .643                                      | .739                                                   | .598    | .211    | 81.8                       | 86.1                                                     | 74.0 | 12.1  |
| 2          | .634                                      | .736                                                   | .508    | .228    | 81.5                       | 85.5                                                     | 74.0 | 11.5  |
| 3          | .631                                      | .735                                                   | .523    | .212    | 81.3                       | 85.0                                                     | 73.8 | 11.2  |
| 4          | .634                                      | .746                                                   | .509    | .237    | 81.0                       | 84.2                                                     | 73.6 | 10.6  |
| 5          | .645                                      | .786                                                   | .498    | .288    | 80.9                       | 84.4                                                     | 73.6 | 10.8  |
| 6          | .663                                      | .812                                                   | .496    | .316    | 81.0                       | 84.0                                                     | 73.9 | 10.1  |
| 7          | .684                                      | .822                                                   | .487    | .335    | 82.1                       | 85.6                                                     | 74.9 | 10.7  |
| 8          | .700                                      | .810                                                   | .527    | .273    | 84.2                       | 87.7                                                     | 77.2 | 10.5  |
| 9          | .710                                      | .828                                                   | .543    | .285    | 86.5                       | 90.6                                                     | 77.4 | 13.2  |
| 10         | .708                                      | .823                                                   | .540    | .283    | 88.8                       | 93.8                                                     | 78.0 | 15.8  |
| 11         | .696                                      | .817                                                   | .539    | .278    | 90.5                       | 95.6                                                     | 78.4 | 17.2  |
|            |                                           |                                                        |         |         |                            |                                                          |      |       |
| Noon.      | .679                                      | .812                                                   | .488    | .324    | 91.9                       | 97.2                                                     | 78.2 | 19.0  |
| 1          | .657                                      | .773                                                   | .462    | .311    | 92.6                       | 98.2                                                     | 77.6 | 20.6  |
| 2          | .632                                      | .738                                                   | .452    | .286    | 93.0                       | 100.0                                                    | 77.4 | 22.6  |
| 3          | .610                                      | .717                                                   | .461    | .256    | 93.1                       | 100.1                                                    | 78.4 | 21.7  |
| 4          | .591                                      | .707                                                   | .436    | .271    | 92.2                       | 100.1                                                    | 79.0 | 21.1  |
| 5          | .585                                      | .705                                                   | .424    | .281    | 90.4                       | 98.7                                                     | 79.6 | 19.1  |
| 6          | .602                                      | .740                                                   | .443    | .297    | 87.8                       | 96.6                                                     | 72.3 | 24.3  |
| 7          | .620                                      | .768                                                   | .450    | .318    | 85.5                       | 91.6                                                     | 75.8 | 15.8  |
| 8          | .635                                      | .745                                                   | .470    | .275    | 84.1                       | 90.7                                                     | 74.5 | 16.2  |
| 9          | .649                                      | .759                                                   | .505    | .254    | 82.9                       | 88.4                                                     | 74.2 | 14.2  |
| 10         | .661                                      | .776                                                   | .533    | .243    | 82.9                       | 88.6                                                     | 74.9 | 13.7  |
| 11         | .662                                      | .760                                                   | .544    | .216    | 82.5                       | 87.7                                                     | 74.8 | 12.9  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Wet Bulb Thermometer. |     | Dry Bulb above Wet.<br>o | Computed Dew Point.             |         | Dry Bulb<br>Point.<br>o | Inches.<br>Mean Elastic force of<br>Vapour. | T. gr.<br>Mean Weight of Vapour<br>in a Cubic foot of Air. | T. gr.<br>Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humidity<br>complete saturation be-<br>ing unity. |
|------------|----------------------------|-----|--------------------------|---------------------------------|---------|-------------------------|---------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------|
|            | o                          | o   |                          | Dry Bulb<br>above Dew<br>Point. | Inches. |                         |                                             |                                                            |                                                                                   |                                                                  |
| Mid-night. | 79.6                       | 2.7 | 78.2                     | 4.1                             | 0.946   | 10.17                   |                                             | 1.41                                                       | 0.878                                                                             |                                                                  |
| 1          | 79.5                       | 2.3 | 78.3                     | 3.5                             | .949    | .20                     |                                             | .20                                                        | .895                                                                              |                                                                  |
| 2          | 79.5                       | 2.0 | 78.5                     | 3.0                             | .955    | .29                     |                                             | .02                                                        | .910                                                                              |                                                                  |
| 3          | 79.3                       | 2.0 | 78.3                     | 3.0                             | .949    | .22                     |                                             | .02                                                        | .909                                                                              |                                                                  |
| 4          | 78.9                       | 2.1 | 77.8                     | 3.2                             | .934    | .07                     |                                             | .07                                                        | .904                                                                              |                                                                  |
| 5          | 78.9                       | 2.0 | 77.9                     | 3.0                             | .937    | .10                     |                                             | .00                                                        | .910                                                                              |                                                                  |
| 6          | 79.1                       | 1.9 | 78.1                     | 2.9                             | .943    | .16                     |                                             | .98                                                        | .912                                                                              |                                                                  |
| 7          | 79.8                       | 2.3 | 78.6                     | 3.5                             | .958    | .30                     |                                             | 1.21                                                       | .895                                                                              |                                                                  |
| 8          | 81.0                       | 3.2 | 79.4                     | 4.8                             | .983    | .51                     |                                             | .73                                                        | .859                                                                              |                                                                  |
| 9          | 82.0                       | 4.5 | 79.7                     | 6.8                             | .992    | .57                     |                                             | 2.53                                                       | .807                                                                              |                                                                  |
| 10         | 83.0                       | 5.8 | 80.1                     | 8.7                             | 1.005   | .64                     |                                             | 3.36                                                       | .760                                                                              |                                                                  |
| 11         | 83.6                       | 6.9 | 80.1                     | 10.4                            | .005    | .62                     |                                             | 4.10                                                       | .721                                                                              |                                                                  |
|            |                            |     |                          |                                 |         |                         |                                             |                                                            |                                                                                   |                                                                  |
| Noon.      | 84.1                       | 7.8 | 80.2                     | 11.7                            | .008    | .62                     |                                             | .70                                                        | .693                                                                              |                                                                  |
| 1          | 84.6                       | 8.0 | 80.6                     | 12.0                            | .021    | .75                     |                                             | .88                                                        | .688                                                                              |                                                                  |
| 2          | 84.6                       | 8.4 | 80.4                     | 12.6                            | .014    | .66                     |                                             | 5.15                                                       | .674                                                                              |                                                                  |
| 3          | 84.6                       | 8.5 | 80.3                     | 12.8                            | .011    | .63                     |                                             | .23                                                        | .670                                                                              |                                                                  |
| 4          | 83.8                       | 8.4 | 79.6                     | 12.6                            | 0.989   | .41                     |                                             | .04                                                        | .674                                                                              |                                                                  |
| 5          | 83.2                       | 7.2 | 79.6                     | 10.8                            | .989    | .45                     |                                             | 4.22                                                       | .712                                                                              |                                                                  |
| 6          | 81.9                       | 5.9 | 78.9                     | 8.9                             | .967    | .28                     |                                             | 3.32                                                       | .756                                                                              |                                                                  |
| 7          | 80.9                       | 4.6 | 78.6                     | 6.9                             | .958    | .23                     |                                             | 2.49                                                       | .804                                                                              |                                                                  |
| 8          | 80.2                       | 3.9 | 78.2                     | 5.9                             | .946    | .13                     |                                             | .08                                                        | .830                                                                              |                                                                  |
| 9          | 79.4                       | 3.5 | 77.6                     | 5.3                             | .928    | 9.97                    |                                             | 1.82                                                       | .846                                                                              |                                                                  |
| 10         | 79.4                       | 3.5 | 77.6                     | 5.3                             | .928    | .97                     |                                             | .82                                                        | .846                                                                              |                                                                  |
| 11         | 79.5                       | 3.0 | 78.0                     | 4.5                             | .940    | 10.09                   |                                             | .55                                                        | .867                                                                              |                                                                  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1855.*

Solar radiation, Weather, &amp;c.

| Date. | Max. Solar radiation. | Rain. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                          |
|-------|-----------------------|-------|-----------------------------------|-----------------------------------------------------------------------------------------------------|
| 1     | 133.0                 |       | S.                                | Cloudy till 10 A. M. cloudless afterwards.                                                          |
| 2     | 139.0                 |       | S. or S. W. or S. E.              | Cloudless.                                                                                          |
| 3     | 133.4                 |       | S. or S. E. High.                 | Cloudless till 7 A. M. scattered clouds afterwards.                                                 |
| 4     | 143.0                 |       | S. E. or S. High.                 | Cloudy.                                                                                             |
| 5     | 130.4                 |       | S. Sharp.                         | Cloudy nearly the whole day.                                                                        |
| 6     | Sunday.               |       |                                   | Sunday.                                                                                             |
| 7     | 135.0                 |       | S. E. or S. High.                 | Cloudy till 10 A. M. cloudless till 6 P. M. scattered clouds afterwards. 12                         |
| 8     | 131.1                 |       | S. or S. W. or S. High.           | Cloudy the whole day, also drizzling at 9 P. M.                                                     |
| 9     | 132.0                 |       | S. or S. E.                       | Cloudy.                                                                                             |
| 10    | ..                    |       | S. E. or S. or E. High.           | Ditto.                                                                                              |
| 11    | 125.0                 | 0.33  | S. High.                          | Ditto.                                                                                              |
| 12    | ..                    |       | S.                                | Ditto.                                                                                              |
| 13    | Sunday.               |       |                                   | Sunday.                                                                                             |
| 14    | 140.1                 |       | S. Sharp.                         | Scattered $\sim$ i.                                                                                 |
| 15    | 133.5                 | 0.55  | S. or S. E. High.                 | Cloudy and constantly drizzling.                                                                    |
| 16    | 127.5                 |       | S. E. or N. E. or E.              | Cloudless till 9 A. M. cloudy afterwards.                                                           |
| 17    | 140.6                 | 0.51  | E. or S. E. or S.                 | Cloudy or scattered $\sim$ i.                                                                       |
| 18    | 130.4                 |       | E. or N. E. or S.                 | Cloudless till 10 A. M. scattered $\sim$ i afterwards.                                              |
| 19    | 141.5                 |       | S.                                | Cloudless nearly the whole day.                                                                     |
| 20    | Sunday.               |       |                                   | Sunday.                                                                                             |
| 21    | 127.9                 |       | S.                                | Cloudless till 9 A. M. scattered $\sim$ i till 5 P. M. cloudless afterwards.                        |
| 22    | 136.0                 |       | S. or S. S. W.                    | Cloudless till 7 A. M. scattered $\sim$ i afterwards.                                               |
| 23    | 142.8                 |       | Calm or S. or S. E.               | Cloudless till 7 A. M. scattered $\sim$ i, afterwards.                                              |
| 24    | 141.0                 | 0.33  | S. or E. or S. W.                 | Cloudless till 7 A. M. scattered $\sim$ i afterwards.                                               |
| 25    | 133.0                 |       | S. or S. E.                       | Scattered $\sim$ i till 6 P. M. cloudless afterwards.                                               |
| 26    | 130.0                 |       | S. E.                             | Cloudless till 5 A. M. scattered $\sim$ i till 4 P. M. cloudy afterwards also drizzling at 11 P. M. |
| 27    | Sunday.               |       | *                                 | Sunday.                                                                                             |
| 28    | ..                    | 3.70  | W. or W. S. W.                    | Cloudy and constantly raining.                                                                      |
| 29    | 133.0                 | 0.37  | S. Sharp.                         | Cloudy.                                                                                             |
| 30    | 124.0                 |       | S. or S. W.                       | Ditto.                                                                                              |
| 31    | 123.0                 | 0.18  | S. or S. E.                       | Ditto.                                                                                              |

$\sim$ i Cirri,  $\backslash$ i Cirro-strati,  $\sim$ i Cumuli,  $\sim$ i Cumulo-strati,  $\backslash$ i Nimbi,  $\sim$ i Strati,  $\backslash$ i Cirro-cumuli.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1855.*

Latitude  $22^{\circ} 33' 1''$  North, Longitude  $88^{\circ} 20' 34''$  East.

Height of the Cistern of the Standard Barometer above the Level of the Sea 18.11. feet

Daily Means, &c. of the Observations, and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of the Barometer at $32^{\circ}$ Fahr. | Range of the Barometer during the day. |         |        | Mean Dry Bulb Thermometer. | Range of the Temperature during the day. |      |       |
|-------|----------------------------------------------------|----------------------------------------|---------|--------|----------------------------|------------------------------------------|------|-------|
|       |                                                    | Max.                                   | Min.    | Diff.  |                            | Max.                                     | Min. | Diff. |
| 1     | .29.544                                            | .29.616                                | .29.478 | .0.138 | 88.2                       | 93.7                                     | 84.2 | 9.5   |
| 2     | .549                                               | .592                                   | .507    | .085   | 88.3                       | 94.8                                     | 82.0 | 12.8  |
| 3     | Sunday.                                            |                                        |         |        |                            |                                          |      |       |
| 4     | .568                                               | .626                                   | .508    | .118   | 88.4                       | 96.1                                     | 81.0 | 15.1  |
| 5     | .555                                               | .611                                   | .473    | .138   | 88.1                       | 93.6                                     | 83.7 | 9.9   |
| 6     | .511                                               | .590                                   | .439    | .151   | 89.6                       | 97.8                                     | 83.6 | 14.2  |
| 7     | .454                                               | .503                                   | .397    | .106   | 88.4                       | 96.4                                     | 84.3 | 12.1  |
| 8     | .479                                               | .559                                   | .423    | .136   | 83.3                       | 90.2                                     | 78.7 | 11.5  |
| 9     | .561                                               | .612                                   | .493    | .119   | 83.4                       | 90.3                                     | 78.4 | 11.9  |
| 10    | Sunday.                                            |                                        |         |        |                            |                                          |      |       |
| 11    | .553                                               | .616                                   | .473    | .143   | 88.8                       | 95.8                                     | 84.2 | 11.6  |
| 12    | .543                                               | .599                                   | .500    | .099   | 88.4                       | 95.9                                     | 84.0 | 11.9  |
| 13    | .545                                               | .609                                   | .482    | .127   | 88.3                       | 96.4                                     | 83.4 | 13.0  |
| 14    | .586                                               | .678                                   | .529    | .149   | 85.0                       | 97.2                                     | 78.8 | 18.4  |
| 15    | .641                                               | .687                                   | .603    | .084   | 81.8                       | 87.0                                     | 77.1 | 9.9   |
| 16    | .613                                               | .669                                   | .539    | .130   | 85.5                       | 91.5                                     | 81.1 | 10.4  |
| 17    | Sunday.                                            |                                        |         |        |                            |                                          |      |       |
| 18    | .639                                               | .691                                   | .601    | .090   | 82.7                       | 86.4                                     | 80.1 | 6.3   |
| 19    | .611                                               | .653                                   | .545    | .108   | 82.1                       | 84.2                                     | 79.8 | 4.4   |
| 20    | .606                                               | .645                                   | .562    | .083   | 82.5                       | 85.6                                     | 79.0 | 6.6   |
| 21    | .656                                               | .712                                   | .610    | .102   | 83.0                       | 86.8                                     | 80.4 | 6.4   |
| 22    | .668                                               | .716                                   | .604    | .112   | 85.6                       | 91.6                                     | 80.3 | 11.3  |
| 23    | .616                                               | .677                                   | .533    | .144   | 86.5                       | 91.6                                     | 82.7 | 8.9   |
| 24    | Sunday.                                            |                                        |         |        |                            |                                          |      |       |
| 25    | .577                                               | .639                                   | .508    | .131   | 86.8                       | 94.7                                     | 81.6 | 13.1  |
| 26    | .534                                               | .596                                   | .460    | .136   | 87.4                       | 93.4                                     | 82.8 | 10.6  |
| 27    | .475                                               | .515                                   | .412    | .103   | 83.2                       | 90.0                                     | 80.0 | 10.0  |
| 28    | .477                                               | .519                                   | .405    | .114   | 84.3                       | 91.3                                     | 80.4 | 10.9  |
| 29    | .468                                               | .508                                   | .419    | .089   | 83.2                       | 88.8                                     | 81.0 | 7.8   |
| 30    | .439                                               | .479                                   | .386    | .093   | 83.6                       | 87.6                                     | 80.8 | 6.8   |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1855.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Date. | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a cubic foot of air. | Additional weight of Vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|-------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
| 1     | 84.4                       | 3.8                 | 82.5                | 5.7                       | .083                          | 11.50                                         | 2.26                                                          | 0.836                                                     |
| 2     | 84.3                       | 4.0                 | 82.3                | 6.0                       | .077                          | .44                                           | .36                                                           | .829                                                      |
| 3     | <i>Sunday.</i>             |                     |                     |                           | Inches.                       | T. gr.                                        | T. gr.                                                        |                                                           |
| 4     | 83.7                       | 4.7                 | 81.3                | 7.1                       | .043                          | .08                                           | .76                                                           | .801                                                      |
| 5     | 83.9                       | 4.2                 | 81.8                | 6.3                       | .060                          | .26                                           | .46                                                           | .821                                                      |
| 6     | 84.4                       | 5.2                 | 81.8                | 7.8                       | .060                          | .22                                           | 3.11                                                          | .783                                                      |
| 7     | 84.1                       | 4.3                 | 81.9                | 6.5                       | .063                          | .28                                           | 2.56                                                          | .815                                                      |
| 8     | 81.0                       | 2.3                 | 79.8                | 3.5                       | 0.995                         | 10.66                                         | 1.27                                                          | .894                                                      |
| 9     | 80.1                       | 3.3                 | 78.4                | 5.0                       | .952                          | .21                                           | .75                                                           | .854                                                      |
| 10    | <i>Sunday.</i>             |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 11    | 84.5                       | 4.3                 | 82.3                | 6.5                       | 1.077                         | 11.42                                         | 2.58                                                          | .816                                                      |
| 12    | 83.8                       | 4.6                 | 81.5                | 6.9                       | .050                          | .15                                           | .69                                                           | .806                                                      |
| 13    | 83.9                       | 4.4                 | 81.7                | 6.6                       | .057                          | .21                                           | .59                                                           | .812                                                      |
| 14    | 81.1                       | 3.9                 | 79.1                | 5.9                       | 0.973                         | 10.40                                         | .13                                                           | .830                                                      |
| 15    | 79.4                       | 2.4                 | 78.2                | 3.6                       | .946                          | .17                                           | 1.23                                                          | .892                                                      |
| 16    | 82.2                       | 3.3                 | 80.5                | 5.0                       | 1.017                         | .87                                           | .85                                                           | .855                                                      |
| 17    | <i>Sunday.</i>             |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 18    | 80.3                       | 2.4                 | 79.1                | 3.6                       | 0.973                         | .45                                           | .27                                                           | .892                                                      |
| 19    | 80.8                       | 1.3                 | 80.1                | 2.0                       | 1.005                         | .80                                           | 0.71                                                          | .938                                                      |
| 20    | 80.0                       | 2.5                 | 78.7                | 3.8                       | 0.961                         | .33                                           | 1.31                                                          | .887                                                      |
| 21    | 80.5                       | 2.5                 | 79.2                | 3.8                       | .976                          | .48                                           | .34                                                           | .887                                                      |
| 22    | 81.3                       | 4.3                 | 79.1                | 6.5                       | .973                          | .38                                           | 2.38                                                          | .813                                                      |
| 23    | 82.0                       | 4.5                 | 79.7                | 6.8                       | .992                          | .57                                           | .53                                                           | .807                                                      |
| 24    | <i>Sunday.</i>             |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 25    | 81.2                       | 5.6                 | 78.4                | 8.4                       | .952                          | .15                                           | 3.06                                                          | .768                                                      |
| 26    | 81.3                       | 6.1                 | 78.2                | 9.2                       | .946                          | .07                                           | .38                                                           | .749                                                      |
| 27    | 81.0                       | 2.2                 | 79.9                | 3.3                       | .998                          | .72                                           | 1.17                                                          | .902                                                      |
| 28    | 81.1                       | 3.2                 | 79.5                | 4.8                       | .986                          | .55                                           | .73                                                           | .859                                                      |
| 29    | 80.7                       | 2.5                 | 79.4                | 3.8                       | .983                          | .54                                           | .35                                                           | .886                                                      |
| 30    | 81.1                       | 2.5                 | 79.8                | 3.8                       | .995                          | .66                                           | .37                                                           | .886                                                      |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.      | Mean Height of the Barometer at 32° Fahr.<br>Inches. | Range of the Barometer for each hour during the month. |        |       | Mean Dry Bulb Thermometer.<br>° | Range of the Temperature for each hour during the month. |      |       |
|------------|------------------------------------------------------|--------------------------------------------------------|--------|-------|---------------------------------|----------------------------------------------------------|------|-------|
|            |                                                      | Max.                                                   | Min.   | Diff. |                                 | Max.                                                     | Min. | Diff. |
| Mid-night. | 29.571                                               | 29.677                                                 | 29.469 | 0.208 | 83.2                            | 86.4                                                     | 78.4 | 8.0   |
| 1          | .561                                                 | .668                                                   | .445   | .223  | 82.9                            | 86.0                                                     | 77.9 | 8.1   |
| 2          | .550                                                 | .656                                                   | .433   | .223  | 82.6                            | 85.4                                                     | 77.1 | 8.3   |
| 3          | .542                                                 | .644                                                   | .429   | .215  | 82.5                            | 85.1                                                     | 77.6 | 7.5   |
| 4          | .542                                                 | .645                                                   | .423   | .222  | 82.3                            | 85.0                                                     | 77.8 | 7.2   |
| 5          | .546                                                 | .652                                                   | .429   | .223  | 82.2                            | 85.1                                                     | 77.9 | 7.2   |
| 6          | .566                                                 | .676                                                   | .435   | .241  | 82.3                            | 85.2                                                     | 77.8 | 7.4   |
| 7          | .580                                                 | .689                                                   | .447   | .242  | 83.2                            | 86.0                                                     | 79.0 | 7.0   |
| 8          | .591                                                 | .698                                                   | .470   | .228  | 84.7                            | 88.4                                                     | 80.4 | 8.0   |
| 9          | .600                                                 | .716                                                   | .474   | .242  | 86.4                            | 90.6                                                     | 81.1 | 9.5   |
| 10         | .601                                                 | .712                                                   | .479   | .233  | 88.4                            | 92.8                                                     | 82.7 | 10.1  |
| 11         | .591                                                 | .712                                                   | .459   | .253  | 89.4                            | 93.8                                                     | 82.3 | 11.5  |
|            |                                                      |                                                        |        |       |                                 |                                                          |      |       |
| Noon.      | .577                                                 | .698                                                   | .451   | .247  | 90.3                            | 95.6                                                     | 81.4 | 14.2  |
| 1          | .558                                                 | .678                                                   | .428   | .250  | 90.0                            | 97.2                                                     | 80.0 | 17.2  |
| 2          | .540                                                 | .655                                                   | .417   | .238  | 89.7                            | 97.6                                                     | 79.8 | 17.8  |
| 3          | .521                                                 | .628                                                   | .399   | .229  | 89.5                            | 97.8                                                     | 80.6 | 17.2  |
| 4          | .506                                                 | .611                                                   | .394   | .217  | 88.9                            | 97.3                                                     | 79.5 | 17.8  |
| 5          | .503                                                 | .623                                                   | .392   | .231  | 87.9                            | 97.0                                                     | 79.3 | 17.7  |
| 6          | .511                                                 | .641                                                   | .386   | .255  | 86.7                            | 94.0                                                     | 79.2 | 14.8  |
| 7          | .528                                                 | .656                                                   | .402   | .254  | 85.6                            | 91.8                                                     | 79.2 | 12.6  |
| 8          | .546                                                 | .678                                                   | .433   | .245  | 84.6                            | 90.2                                                     | 79.2 | 11.0  |
| 9          | .565                                                 | .694                                                   | .452   | .242  | 84.1                            | 88.6                                                     | 78.8 | 9.8   |
| 10         | .576                                                 | .691                                                   | .469   | .222  | 83.7                            | 87.2                                                     | 79.0 | 8.2   |
| 11         | .577                                                 | .682                                                   | .469   | .213  | 83.4                            | 86.4                                                     | 78.7 | 7.7   |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (*Continued.*)

| Hour.      | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. |                  | Computed Dew Point. |                  | Mean Elastic force of Vapour. | Mean Weight of Vapour in a Cubic foot of Air. | Additional weight of vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|------------|----------------------------|---------------------|------------------|---------------------|------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
|            |                            | Dry Bulb            | above Dew Point. | Dry Bulb            | above Dew Point. |                               |                                               |                                                               |                                                           |
| Mid-night. | 80.8                       | 2.4                 | 79.6             | 3.6                 | 0.989            | 10.60                         | 1.29                                          | 0.892                                                         |                                                           |
|            | 80.8                       | 2.1                 | 79.7             | 3.2                 | .992             | .66                           | .13                                           | .904                                                          |                                                           |
|            | 80.8                       | 1.8                 | 79.9             | 2.7                 | .998             | .72                           | 0.96                                          | .918                                                          |                                                           |
|            | 80.7                       | 1.8                 | 79.8             | 2.7                 | .995             | .69                           | .95                                           | .918                                                          |                                                           |
|            | 80.6                       | 1.7                 | 79.7             | 2.6                 | .992             | .66                           | .92                                           | .921                                                          |                                                           |
|            | 80.5                       | 1.7                 | 79.6             | 2.6                 | .989             | .63                           | .91                                           | .921                                                          |                                                           |
|            | 80.6                       | 1.7                 | 79.7             | 2.6                 | .992             | .66                           | .92                                           | .921                                                          |                                                           |
|            | 81.2                       | 2.0                 | 80.2             | 3.0                 | 1.008            | .81                           | 1.08                                          | .909                                                          |                                                           |
|            | 81.9                       | 2.8                 | 80.5             | 4.2                 | .017             | .89                           | .53                                           | .877                                                          |                                                           |
|            | 82.8                       | 3.6                 | 81.0             | 5.4                 | .034             | 11.03                         | 2.03                                          | .845                                                          |                                                           |
| Noon.      | 83.6                       | 4.8                 | 81.2             | 7.2                 | .040             | .05                           | .79                                           | .798                                                          |                                                           |
|            | 83.8                       | 5.6                 | 81.0             | 8.4                 | .034             | 10.96                         | 3.29                                          | .769                                                          |                                                           |
|            | 84.1                       | 6.2                 | 81.0             | 9.3                 | .034             | .94                           | .69                                           | .748                                                          |                                                           |
|            | 83.7                       | 6.3                 | 80.5             | 9.5                 | .017             | .76                           | .74                                           | .742                                                          |                                                           |
|            | 83.6                       | 6.1                 | 80.5             | 9.2                 | .017             | .78                           | .59                                           | .750                                                          |                                                           |
|            | 83.7                       | 5.8                 | 80.8             | 8.7                 | .027             | .87                           | .42                                           | .761                                                          |                                                           |
|            | 83.2                       | 5.7                 | 80.3             | 8.6                 | .011             | .71                           | .33                                           | .763                                                          |                                                           |
|            | 82.8                       | 5.1                 | 80.2             | 7.7                 | .008             | .71                           | 2.93                                          | .785                                                          |                                                           |
|            | 82.4                       | 4.3                 | 80.2             | 6.5                 | .008             | .73                           | .45                                           | .814                                                          |                                                           |
|            | 81.7                       | 3.9                 | 79.7             | 5.9                 | 0.992            | .59                           | .17                                           | .830                                                          |                                                           |
|            | 81.4                       | 3.2                 | 79.8             | 4.8                 | .995             | .64                           | 1.75                                          | .859                                                          |                                                           |
|            | 81.0                       | 3.1                 | 79.4             | 4.7                 | .983             | .51                           | .70                                           | .861                                                          |                                                           |
|            | 81.0                       | 2.7                 | 79.6             | 4.1                 | .989             | .60                           | .47                                           | .878                                                          |                                                           |
|            | 81.1                       | 2.3                 | 79.9             | 3.5                 | .998             | .69                           | .27                                           | .894                                                          |                                                           |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1855.  
Solar radiation, Weather, &c.*

| Date. | Max. Solar radiation. | Rain. | Prevailing direction of the Wind.       | General Aspect of the Sky.                                       |
|-------|-----------------------|-------|-----------------------------------------|------------------------------------------------------------------|
| 1     | 124.0                 | ..    | S.                                      | Cloudy.                                                          |
| 2     | 126.5                 | ..    | S. E. or S.                             | Cloudy also rain at 8 P. M.                                      |
| 3     | Sunday.               |       |                                         | Sunday.                                                          |
| 4     | 137.0                 | ..    | s. or e. or s.e. or s.w.                | Cloudy.                                                          |
| 5     | 122.7                 |       | S. E. or E.                             | Thin clouds over the whole sky.                                  |
| 6     | 133.0                 |       | E. or S. E. or S.                       | More or less cloudy till 7 P. M. cloudless afterwards.           |
| 7     | 128.8                 | ..    | S. E. or S. or N. E.                    | Cloudless till 5 A. M. more or less cloudy afterwards.           |
| 8     | ..                    | ..    | N. or E. or S. E.                       | Cloudy the whole day, with constant drizzling.                   |
| 9     | 124.0                 | 0.10  | S. E. or E.<br>[or S. E.]               | Cloudy.                                                          |
| 10    | Sunday.               |       | S. (high occasionally)                  | Sunday.                                                          |
| 11    | 131.4                 | ..    |                                         | Cloudy till 1 P. M. scattered & afterwards.                      |
| 12    | 130.0                 | ..    | S. E. (sharp before<br>[sunrise] or S.) | Cloudless till 5 A. M. various clouds afterwards.                |
| 13    | 132.0                 | ..    | S. E. or S.                             | Cloudy.                                                          |
| 14    | 130.0                 | 1.11  | S. E. or S. or E.                       | Cloudless till 5 A. M., cloudy afterwards with occasional rain.  |
| 15    | 128.9                 | 0.93  | S. W. or S. or E.                       | Cloudy and constantly drizzling or raining.                      |
| 16    | 126.0                 | ..    | S. E.                                   | Cloudy, also drizzling at 5 P. M.                                |
| 17    | Sunday.               |       | S. E.                                   | Sunday.                                                          |
| 18    | ..                    |       |                                         | Cloudy and constantly raining or drizzling.                      |
| 19    | ..                    | 1.02  | S. E.                                   | Overcast also raining at 5 and 6 A. M. and drizzling at 10 A. M. |
| 20    | ..                    | 0.13  | S. E.                                   | Cloudy, also raining at 5 A. M. and drizzling at noon.           |
| 21    | ..                    | ..    | S. E.                                   | Cloudy.                                                          |
| 22    | 137.0                 | ..    | S. E. or S.                             | Cloudless till 8 A. M., more or less cloudy afterwards.          |
| 23    | 122.0                 | ..    | S.                                      | Cloudy the whole day.                                            |
| 24    | Sunday.               |       | S. W. or S.                             | Sunday.                                                          |
| 25    | ..                    | ..    | S. W. or W.                             | Cloudy the whole day.                                            |
| 26    | 127.0                 | ..    | S. E. or S.                             | Ditto.                                                           |
| 27    | ..                    | 1.61  | S. E. or E.                             | Cloudy also constantly raining.                                  |
| 28    | 129.0                 | ..    | S. E. or E.                             | Cloudy also rain after sunset.                                   |
| 29    | ..                    | 0.94  | E. or N. E.                             | Cloudy also rain between 1 and 3 P. M.                           |
| 30    | ..                    | ..    | N. E. or E.                             | Cloudy with occasional rain.                                     |

—i Cirri, —i Cumuli, —i Strati,  $\bowtie$  i Cirro-cumuli,  $\wedge$  i Cirro-strati, ~i Cumulo-strati,  $\bowtie$ -i Nimbi.